SUPPLEMENT.

The Mining Journal,

AILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

ORKS OF THE NORTH OF ENGLAND—No. VII.

INDUSTRIAL IRON AND COAL COMPANY.

ly three years since this company was formed for the xtending the principle of industrial partnership between nd employed in the iron trade of the Cleveland district. ime the principle had been confined in this country to od Collieries, belonging to the Messrs. Briggs, where its peration has become almost a matter of history, and to tive Ironwroks, in Cleveland, belonging to Fox, Head, ere, however, it was applied in a somewhat different rinciple being so new, it may be well before proceeding efer briefly to its origin. Professor Fawcett says that no branch of industry have so many angry differences een employers and employed as in the coal trade. Mr. in a state of chronic warfare with his men. No one a strike with more unflinching determination. These lted in the most serious loss both to him and to his work- profits of his business were greatly reduced. He lived perpetual civil war. Things came to such a pass that ed to give up business. In a happy moment one of his Currer Briggs, now chairman and managing director of f England Industrial Iron and Coal Company—advised co-operation. A joint stock company was accordingly h a capital of 135,000*l.*, in shares of 10*l.* each—two-thirds ed by the owners of the colliery, while the remaining ns offered to the workmen. It was also arranged that ing aside a proper amount for wear and tear, the actual ld exceed 10 per cent. one-half should be allowed as ad- idend to capital, and the remaining one-half should be amongst workmen in proportion to wages earned by dual. By this mode of appropriation the labourer only average rate of wages current for similar work, unless ncreased efficiency and care in his work, stimulated by additional reward, increase the profit of the capitalist, be a loser, and may be a gainer, by the arrangement. od the experiment, which was undertaken with fear and has proved eminently successful. Masters and men are onds of common interest, and harmony and good feeling ere formerly there were only hostility and recrimination. e firm of Samuel Bastow and Co. was dissolved, some he Carlton Ironworks, near Stockton-on-Tees, came into They were in a very dilapidated and incomplete state, ere, after a considerable interval, purchased by a number en, who formed the North of England Industrial Iron and any, with an authorised capital of 250,000*l.* Among the s of the new company were the Duc de Chateris and Mr. ughes, M.P., while Mr. Walter Morrison, M.P., and Mr. Briggs, of the Whitwood Collieries, are among the direc- s determined that the works should be conducted on the hat had operated so successfully at Messrs. Briggs' col- workmen were invited to become shareholders. A few ponded to the invitation, all of them being employees of ny. In July, 1870, the reconstruction of the works at s commenced. The two blast-furnaces were raised from in height, the brickwork of the furnaces was renewed, dred feet of new and enlarged underground gas flues and rts were built, the blast-engine was repaired, and a se- e, with a 100-inch blowing cylinder, was ordered from hrane, Groves, and Co., of Middlesborough. Eight of Whitwell's patent hot-blast stoves were erected, and rovements and extensions were carried out. All this the ere in a position to report to the shareholders six months orks had been taken possession of.

n the company have made gigantic strides, and their t has exhibited a rare amount of enterprise and foresight. nace has been erected, reaching, like the other two, a 0 ft., and it has just been blown in. The three furnaces weekly production of nearly 1200 tons pig-iron. They d up with Wrightson's patent hydraulic hoist, which is cated than Sir William Armstrong's appliance, and works the accumulator. The two cages of the hoist are made de in spaces between three columns, placed in line, and e framework. One of the cages is so much heavier than hat it will draw the latter up when loaded with its bar- owerful brake brought to bear upon the fixed pulleys ower at any time to control the descent of the heavy ise the heavy cage, with its barrows, a loose running laced on the shaft midway between the fixed pulleys; has two grooves, from one of which a chain fastened to the pulley passes down to a weighted ram, working ulic cylinder. To work the hoist a small engine is used, inually pumps into the cylinder, except when the ram is when the water is diverted to the tuyere tank; thus an uch less power than that ordinarily used for direct lifts Among the new works that are now being fitted up oist are those of Mr. Thos. Richardson and Son, Hartle- es Bridge Iron Company, Stockton, and Downey and Co., ough. There are, however, other and older established e Cleveland district that have recently adopted this ar- of hoist. At the Carlton Works there is also a patent wering and raising the furnace bells, by means of which f gas in the operation is reduced to a minimum. This invention of Mr. Wrightson, of Stockton. The bell is an ordinary beam, with a balance weight at the opposite always keeps the bell close until the charge is liberated. g rod attaches the balance weight end of the beam to f a small oscillating cylinder, filled with water. When to lower the charge the back screw catch is released r of a handle, and the valve is opened. As the bell de- iston rises, the water at the top of the piston passing passage and valve to the under side of the piston. As ell is relieved of its charge the piston descends again, closes, the operation only lasting 8 or 10 seconds. By e Whitwell patent hot-blast stove the heat of the blast furnaces is raised to a temperature of 1300 to 1400 deg.

But the principal feature of the Carlton Works is undoubtedly the new malleable ironworks, which are now all but completed, and about which there are several novelties. Eight of Danks' patent rotary puddling furnaces have been erected, and it is worthy of remark that this company were the first to arrange for the use of this invention in Great Britain. They had even arranged with the parentee before the commission appointed by the Iron and Steel Institute visited America for the purpose of inspecting and testing the merits of the furnace, although they awaited the result of the report of the commission before actually commencing operations. Owing to their having been thus early in the field the company received more favourable terms from the patentee than can now be obtained—the sum now charged for each license being 250*l.* per furnace. The Carlton furnaces are erected after the manner which we have already described in our columns, and the total cost of malleable works, including puddling machines and puddled bar mill, is set down at 15,000*l.* We may here remark that up to this date the following firms have taken out licenses to work Danks' furnaces:—Hopkins, Gilkes, and Co., Crinnis Iron Company, North of England Industrial Iron Company, Omoa and Cleveland Iron Company, Robert Heath, R. Jacques and Co., London and North-Western Railway Company, and Cooke, Swimmerton, and Co. In their new malleable works at Carlton the company are putting down a self-acting rolling mill of novel construction, and the first of the kind, we believe, that has yet been erected. It is built and patented by Messrs. Kirk Brothers, of Workington, and it is especially designed for manipulating large masses of iron, and obviating a considerable amount of manual labour. The rolls are on the equilibrium principle, are three-high, and work both ways. When they have been fairly set agoing and tested we may have more to say about them.

From the commencement the North of England Industrial Iron and Coal Company worked the Belmont Ironstone Mines for their own purposes. These mines are situated near Guisborough, and although they were only partially worked the sales of ironstone for the first eleven months after the company was formed yielded 18,485*l.* In the beginning of last year the directors negociated the terms of lease for 40 years of several thousand acres of ironstone, the property of the Marquis of Aylesbury. A mine had been worked on this royalty many years previously, but it had to be discontinued, and it was acquired on easy terms by the company, who now put out from 2000 to 3000 tons per week. The production of the South Belmont Mines is nearly 1000 tons per day. In addition to their ironstone mines, the company in the course of last year acquired a coal royalty in South Durham, and they have recently sunk a new winning to the lower seams, and fitted up appliances necessary for a daily output of 500 tons. The necessary coke ovens have been erected near at hand, so that the company have now everything within themselves. It may be interesting to add that the following is the estimated annual net profit on the production of the company's mines and works (irrespective of any profit on the coal) when in full operation:—Working of ironstone, 7500*l.*; manufacture of pig-iron, 15,000*l.*; and manufacture of malleable iron, 10,000*l.*: giving a total of 32,500*l.* In this profit the officials and workmen of the company will be entitled to participate over and above 10 per cent. upon the paid-up capital of the company.

It only remains to be added that the company's works at Carlton cover 40 acres of ground, and were laid out by the late Mr. Ramsay, their engineer, assisted by Mr. H. Currer Briggs, the managing director.

THE SOUTH STAFFORDSHIRE COAL FIELD.

SIR,—I regret to say that in the accounts published last week of the proceedings of the South Midland Institute of Mining Engineers I am made to hold opinions which I have always opposed.

I do not wish the subject which I laid before the Institute to be lost sight of in the district in consequence of the proposition being imperfectly laid before it, and, therefore, with your permission, I write down, for publication in your paper, the views I entertain in favour of offering a prize for the best essay upon the Thick Coal of South Staffordshire; or, what would be still better if it were not almost too large a subject, on the South Staffordshire and adjoining coal fields.

It seems to me, since we have three scientific societies existing in this division of the county, under their auspices some of the current questions relative to the development of the South Staffordshire coal field should be settled, or at best that they should not allow them to sleep until they are settled. We have the most notorious coal seam in Great Britain, and its geological phenomena are most uncommon and worthy of enquiry. The district is pierced with shafts in all directions, so that the lateral changes in the strata can be traced almost yard by yard, and we have, as a guide how to use the evidence we may collect, one of the ablest Memoirs ever issued by the Geological Survey on any coal field.

Since the second edition of "Jukes's Memoir" nothing of much value on the subject has been published. It is now 14 years since that edition of the Memoir appeared, and I cannot help thinking, as we no longer have a Jukes to continue the work, we must evoke what is in men's minds upon that subject by offering a prize for an essay which will, of course, embody all the best information on the subject that can be obtained. If it be asked—What practical good can come of it? What more can we learn about it than we already know—which is that if you will go deep enough over the western boundary fault you will find it—I will answer that almost every source of knowledge may be dammed up by this *cui bono* spirit of enquiry. We want to evoke information, not to suppress it. Why should we take it for granted that because we are ignorant of them there are no new facts or thoughts upon the question? Anyone who asks such a question can never have thought how very little we do know, and how much there is to be learnt. Thus, I would ask him—What is the nature and shape of the eastern and southern boundary of the South Staffordshire coal field? Is the western boundary fault a dislocation or a cliff? I have my own opinion, that there can be no doubt it is a dislocation, but there are other geologists equally convinced that it is a cliff. I would ask, if it be granted that the Thick coal is thrown by a fault, in what condition shall we find it? Will it have all the upper coal measures upon it—some 700 ft. thick; or should we find it at about the same depth below the base of the Permian as on the top side of the fault it is found below the surface? I consider there are ample materials for working out these problems, but they must be treated on a large and comprehensive scale, and by a study of contiguous coal fields, which are obviously part and parcel of our own. Is it useless, and of no practical value, that this subject should no longer be brought forward when I tell you that our best men, even of the Geological Survey, are not settled in their own mind whether the large area of coal measures in the Forest of Wyre are upper coal measures only, or whether they are the reappearing coal measures of South Staffordshire, but in an attenuated condition?

I cannot help thinking that the three local geological societies would do well to devote a small portion of their funds to such a purpose, in order to make it a basis upon which to apply for subscriptions in the district for the purpose of raising a small fund—say, of 200*l.* or 300*l.*—for this purpose.

It is, moreover, of some importance to keep the matter of the extension of our coal fields before those who hold properties in the Permian districts, and they certainly want educating up to the modern knowledge on the subject.

We do not want an essay containing the repetition of the old tale of Dud Dudley's experiences, and the early history of coal mining in the district, but we want a clear and explicit statement of all the important facts which have accumulated since Mr. Jukes last wrote upon the question. We want opinions as to the extension of our coal field, and the reasons for them. If the Geological Survey were likely to send a geologist into this district to carry on the work of Prof. Jukes, and issue a third edition of his Memoir, there might not be any necessity for the essay which I have proposed; but as this is not likely to be the case, I have ventured to lay my proposition before the councils of the South Staffordshire and East Worcestershire Mining Engineers, the South Midland Institute of Mining Engineers, and the Dudley Geological Society, and if approved of by them the scheme may be matured by asking for additional subscriptions, and the printing of the conditions upon which the competition is to be conducted. DANIEL JONES.

Albrighton, Oct. 6.

COAL SUPPLY IN STAFFORDSHIRE.

SIR,—The attention of all the thinking population of Birmingham and South Staffordshire has been during the last two years directed to Sandwell Park sinking, and at intervals a lively hope has been felt in the expectations held out of the black diamonds being a sure result, but lately I am sorry to say that the reports we hear (which are many) are rather depressing than otherwise, and should this sinking only go to prove the non-existence of coal over the great fault which crosses West Bromwich in the direction for Titford, the future supply of coal must be found elsewhere, and South Wales, which is now doing so very much for us in coke for our furnaces and foundries will assuredly have to do much more. The Birmingham and Blakeley Hall Colliery Company have this day taken to their property (which belonged to Mr. Reuben Plant), and which is proved beyond a doubt to be first-class, the coal and ironstone having been got on one side by Messrs. Dawes, and on the other side by the late Messrs. Williams and Parker; and as the pits are sunk through the coal the company will no doubt be in the market at once with coal from the 30-ft. bed, with a gradual but rapidly increasing output up to 3000 or 4000 tons per week; we are also told that this property contains in all about 5,000,000 tons of coal. So far so good, but we want many such collieries to supply the places of those which are being so rapidly exhausted.

Again, should the sinking of the Sandwell Park Company prove the non-existence of coal on this side of the fault, the hopes of those requiring large quantities of coal or coke cannot long be realised, except by importation from other districts. There is another point—that the consumption is daily increasing, while the power of supply is rapidly decreasing. We are assured that Blakeley Hall is the largest Thick coal estate unworked in the district, except that in the hands of Lord Dudley. It is said some London sharpers have made their descent into this district, and resolved to benefit at someone's cost, and taken properties for the purpose of forming companies on the sure and certain hope of making a profit, and that no one else will ever get a shilling of profit or return of capital. If these rumours are correct, we have no doubt the people of Birmingham and district will know how to deal with the matter. COAL.

MINING ENTERPRISE IN NORTH STAFFORDSHIRE.

SIR,—We have heretofore on several occasions referred to the rich resources of North Staffordshire, and particularly to the great thickness of the seams, as compared with those of South Staffordshire, and it is gratifying to find that enterprise commensurate with the requirements of the development of so much mineral wealth is about to be brought to bear upon it. The way in which the North Staffordshire engineers are preparing to grapple with the difficulties of great depth ought to stimulate those of Childs Ercall, even if it does not lead to further attempts to reach the rich mines which are believed to lie beneath the Permians. It appears that it is the intention of the Chatterley Iron Company to sink a 15-ft. diameter shaft, with 14-in. brickwork throughout, at Pitt's Hill, near Tunstall, to reach the Rowhurst coal, so much prized for ironmaking and pottery purposes. Mr. C. J. Homer, the managing director, is already sinking a pit on Chell Heath, for the purpose of ascertaining whether or not the Rowhurst coal could be found at Pitt's Hill. The Chell Heath pit is close to the western side of the great fault, which, running north and south, bisects the whole of the North Staffordshire coal field. Having reached the Winghay coal—which is between 7 and 8 ft. thick, and of the best quality—he at once resolved upon extensive operations for the winning of the still more valuable Rowhurst seam. At these pits the Rowhurst and Winghay seams alone will yield more than 3,000,000 tons, or 1000 tons a-day for the next ten years, to say nothing of intermediate seams of coal and ironstone. It is confidently expected that at the pit, the first sod of which was cut on Monday, the Rowhurst coal will be reached at a depth of less than 250 yards, and that the Twist coal will be found 70 yards below that. Below these come the Norton series, with the famous Hard Mine at a depth of 780 yards, and the Cockhead's at about 900 yards. Mr. Homer stated that he hoped to live to see the pit 1000 yards deep, that depth being necessary for the projects he had formed, and, in his opinion, quite practicable. In this way, taking the properties of the Chatterley Iron Company and of two neighbouring proprietors, he found there

were 50,000,000 tons of coal to be won, or 2000 tons per week for the next 50 years. That being the case, there is not much probability of a coal famine in the North of the Potteries within the experience of many persons at present living. JOHN RANDALL.

Madeley, Oct. 14.

SPECULAR IRON ORE IN ALGERIA.

SIR,—Some months ago an alarm was raised in the iron trade throughout the length and breadth of Great Britain by the announcement coming from unfortunate Spain, according to which the pretender, Don Carlos, had ordered all the mines owned by Englishmen in the Asturias and in Navarre to be shut up, and the miners to be enrolled amongst his cut-throat gang to fight for "God and the King." By this barbarious measure the supply of Spanish ores was stopped all at once, and notwithstanding the repeated recent routs of Carlists riffraff, reported by Reuter, the working of those mines does not seem to have been resumed, and the revival of the Spanish iron trade appears very remote. In a country so unsettled as Spain the *pays de l'imprevu*, it is difficult to say what is likely to happen any day, and for aught we know, the present anomalous state of things may continue for two years or only last as many days. Under these circumstances, it would affect the iron market most injuriously if it were to remain dependent on Spanish ores. Consumers of these will, therefore, be pleased to learn that there are other fields which, with but little attention and outlay of money, might be made to yield a regular supply of iron ores superior to those of Spain.

A deposit of this description of ore has been lately discovered in Algeria in a most favourably situated part of the country. The ore is quite equal to the far-famed iron ore produced by the Isle of Elba. To give an idea of the nature of Algerian iron ore I can do nothing better than to subjoin a translation of the report of Mr. de Marigny, late director of the Geological College of Algeria, who after examining the deposit reported thereon.

The concession of this iron property is extending over 2000 acres or thereabouts, and there is nothing to pay for ground rent, except the usual redevance to the Government on the ore extracted.

Mr. de Marigny says in his report—"This set of specular iron ore crops out on the right bank of the 'Oued-el-Keddache' (small river) at an altitude of about 270 yards above the level of the sea; the iron ore is in contact with mica-schist and volcanic stone, the lode follows the right bank of the river for about 60 yards, with 25 yards in depth and 12 to 20 yards in width. The sides of the river are so covered with wood that it is impossible to ascertain exactly the dimensions and direction of the lode; some preliminary work would have to be made to enable further examination. The ore is composed of specular iron in small and compact crystals of the colour of steel; it looks exceedingly pure, and the lode is generally of the same quality. In a few rare pieces the ore has been transformed into hydrated hematite by action of atmosphere. At a short distance from both ends of the lode I have been able to examine voluminous blocks of the same ore are found, indicating that in all probability the lode is extensive, and that the ore is abundant on the rocks of the Bou-Merdes.

This set of specular iron is situated about two miles from the port 'Aux poules,' and from there it would be easy to transport it to Algiers by small steam-tugs or other similar means. On account of this facility of transport, and of the importance of the property, I think that it would prove more than profitable to begin some researches upon a larger scale than I have been able to do. The ore contains 65·90 per cent. of metallic iron. The analysis of a sample taken in the bulk has shown the following results:—Peroxide of iron, 95·00; alumina, 1·50; carbonate of lime, 1·50; carbonate of magnesia, 1·00; silica, 0·70: loss, 0·30=100·00. No phosphorus nor sulphur."

I may add that since Mr. de Marigny thus reported on that property the wood has been burned, and now it would be easy and inexpensive to make further researches. Moreover, a projected railway—Alger to Bougie and Delhys—is to pass through the property, and I think the concession of this line might also be obtained.

7, *Carlton-square, New Cross, Oct.* 15. A. VASSARD.

GOLD IN NEW SOUTH WALES.

SIR,—In January last you honoured me by inserting an account of an extraordinary gold-bearing deposit near Carcoar, which the Rev. Mr. Clarke, our eminent geologist, believes to have been originally a boiling spring. When I wrote you the mine (of about 50 acres), then being worked on the north-west side of the creek, was supposed to contain the main lode, or dyke, of gold-bearing stuff of from 200 ft. to 300 ft. wide, and, as such, was probably one of the largest known deposits in the world; but since then the Brown's Creek Freehold Gold Mining Company (of 112 acres) have been opening up the land on the other or south side of the creek; and, in addition to the same main lode crossing through it into their property, have cut into several other parallel lodes at varying distances, one of which, running north-east and south-west, is about 40 ft. wide from the hanging-wall to the foot-wall, and not only richer in gold than the great main lode, but rapidly improves in depth. In another portion of the property, about half a mile away, a large outcrop of ironstone and quartz occurs, quite different in its general appearance, though gold-bearing also; while between this and the main lode, at a depth a 60 ft., a decomposed greasy earth, of a pale olive colour, was found to yield as much as 1 oz. of free gold per ton, although not even a speck could be seen in it by the naked eye.

While cutting the water race to the crushing battery signs of gold were found all along the alluvial flat, and in digging out the foundation for the engine smaller "leaders" were come across. The surface soil is of extraordinary richness for farming purposes, and in more senses than one, for on pulling up a plant of maize, and looking at the earth among the roots, small specks of gold were just discernible with the aid of a glass. The principal solid reef is a kind of hornblende, and with it is also a bastard opal.

In all the trial shafts, trenches, drives, tunnels, and cuttings (displaying different kinds of earth and rock), gold is found, more or less; and as these extend for several hundreds of yards in different directions, the proof is now almost absolute that, whether as a gold mine or a geological curiosity, the Brown's Creek deposits are some of the most extraordinary yet discovered in any part of the world.

The directors and trustees, two of whom are men of great scientific acquirements, have specially instructed the miners to look out for any fossil remains, especially as the deep sinking progresses, and should there be any special discoveries made I will see that you or some of the English scientific societies are made aware of them.

ROBERT ADAMS.

IMPROVEMENTS IN STAMPS GRATES.

SIR,—A few weeks since there were several interesting letters in the *Mining Journal* respecting the dressing of tin—whether it should be crushed coarse or fine, and I think nearly as many opinions were expressed one way as the other. Now, I think it must be obvious to anyone even not intimately acquainted with mining that if the tin or other kind of ore be crushed very fine there must be greater difficulty in dressing it than if it be left larger and heavier; but then there is another difficulty—so long as the grates are 3 or 4 in. above the bed the stuff must be got fine before it will rise sufficiently. Now, I have been thinking since I read the articles in the *Mining Journal* about Walker's new plan for collecting and amalgamating gold at once in the stamps bed, that if the process be so valuable for gold it must be equally so for tin and other ores, for I look upon the plan of having the grates below the bed as being perfection itself. There the heavy and rich part of the ore falls through the grates by its own gravity, and there is no occasion to crush it into slime.

In consequence of the notice in the Journal I went to examine the models at the inventor's works in James-street, Old-street, and saw the models of the machine of full size and ready for the foundry; and it occurred to me that we must have been indeed foolish to have worked so long upon the system of making the richest part of the ore into worthless slime. The whole affair is so easily understood that there can be no misapprehension as to the value of the machine. I trust that the invention will speedily come into general use, and I believe you cannot confer a greater benefit upon the mining community than by keeping them well informed of the work done by the new stamps as soon as they are in practical operation.

London, Oct. 9. MINING ENGINEER.

ECONOMICAL DRESSING OF TIN ORES.

SIR,—I am, like many others just now, very much interested about the simplest and cheapest plan of dressing our tin ores ready for market. It has often occurred to me that the tin is stamped altogether too fine, which makes it very difficult to dress, and of course if not pretty clean there is a corresponding loss by the smelter. I have been thinking if Walker's plan was adopted of putting the grates below the bed, so that the heavy particles of tin would descend into the pockets, and be collected altogether separate from the fine that passes through the upper grates, and whether a few hundredweights of tin might not be collected every day nearly clean, it would be very acceptable, and if those beds could be introduced to the present stamps, it might improve our future prospects so as to make it most valuable.—*Oct.* 15. CHARLES CLARKE, Mining Engineer.

FIRE-PROOF BUILDINGS.

SIR,—I do not know whether the subject of fire-proof buildings is so well adapted to the pages of the Journal as mining matters, but still every reader is more or less interested in having his house fire proof, and for which now, by adopting Walker and Ragon's patent for rendering all buildings fire-proof, there need be no excuse. There has been a difficulty in getting the iron rolled properly, but Messrs. Thornicroft's people have agreed to roll it exactly as it is wanted, and there is every prospect of getting it adopted. The great principle of the invention is to use very little timber in the floors, but still to adopt the present plan of joists for lathing and nailing down the floors. There is as much timber used in one of our present warehouses as would make eight warehouses on this new plan; for instance, we take joists at present used 11 in. by 3 in., we put a flat cut down the middle, and three deep cuts, that make eight joists 5½ in. deep and ¾ in. thick: this piece of timber is then put between two thin flitches of iron, they are rivetted together on the joist and fixed in the usual way; you have now a joist very much stronger than the joist 11 in. by 3 in., and one you cannot burn, for warehouses or first-class buildings where you want to make them perfectly fire proof; then the iron has a small ½ in. flange on the bottom edge to carry a fire-proof tile, the joists are all laid 12 in. apart, and the tiles are just 12 in., and they are placed between the joists close together, and then 2 or 3 in. of concrete next the floor, and you have a fire-proof house. The only difficulty in the way is, it would require a large firm with large premises to carry out such a work, to supply all the large towns of the three kingdoms, besides Belgium and France, patents being also secured for them. J. WALKER.

12, *James-street, Old-street.*

ROCK BORERS.

SIR,—A few remarks from me on the discussion as to rock borers may not be out of place at the present time. With regard to the use of the "stretcher bar," there can be no doubt that it has been used long ago, and its first use cannot be claimed by Mr. Brain. Among others, the Esgair Hir Lead Mining Company, the Crosfield Iron Ore Company, and Mr. Davidson, of the Newbottle Colliery, used the "stretcher bar," I believe, long before Mr. Brain had ever tried a rock drill. I, however, perfectly agree that a stretcher bar is a useful means of fixing a drill in a shaft or level, or in stopes where the lode would be from 2 to 6 ft. wide.

Of rock borers I have had considerable experience, and was among the first to try the "Burleigh" drill, which, when in order, bored very well, although its length was considerably against it for sinking, &c. I have now purchased a drill called the "Kainotomon," and I have no hesitation in saying that it is the simplest and best boring machine I have yet seen, and to a very great extent answers Mr. Kember's notion of what such a machine should be. There is really little or nothing to get out of order, and the small machine I have does its work admirably, though it weighs only 1 cwt. 43 lbs. without stand. I should be willing to show this rock drill to any of your readers who may be in this neighbourhood and interested in boring by machinery. I am not one of those who believe there is no room for improvement, and possibly a discussion of this nature in your valuable Journal might lead to a advancing the perfection of this class of machinery, which would be a benefit to all connected with mining. WILLIAM WASLEY.

Mold, Flintshire, Oct. 14.

THE GREAT LAXEY, AND ITS MANAGEMENT.

SIR,—Although it has been conclusively shown that it is to the constitution of the board of direction that the shareholders must attribute the heavy loss which they sustained, and will continue to sustain, through the strike of the miners, the exorbitant and excessive payments made for bank charges, and the oppressive terms of the lease under which the property is now held, it is marvellous to find that so many independent shareholders are still content, meeting after meeting, to trust their proxies to the chairman, and thus perpetuate a state of affairs which is at once discreditable to the company and calculated to bring mining enterprise in the Isle of Man into disrepute. Well might Dr. Thompson acknowledge the truth of the remark that, as concerned the directors, their dealing with the strike was a bungle, their dealing with the lease was a bungle, and that the shareholders were constantly suffering from their bungles; if, indeed, there were no reason to fear that the transactions were effected with less carelessness than some have supposed. In the present position of affairs, it appears to me that two steps are essentially necessary—the separation of the office of chairman and banker of the company, and the removal of the chief office to London, Liverpool, or elsewhere, beyond the control of the Manx interest. The losses and waste from which the shareholders now suffer would suffice to nearly double the rate of dividends, taking the average of the last seven years. The chairman may be quite sincere in stating that he has no delicacy in acting as chairman and banker simultaneously, but this is scarcely a question which should be left for his consideration. The principle is wrong; it is unjust to the shareholders, and lays Mr. Dumbell open to temptations which stronger men than he have been unable to resist.

Those independent shareholders who are too dilatory to look after their own interest, and, therefore, continually send their proxies to the chairman or secretary as long as there are no calls to pay, are the very first to complain when the crash comes, and they may rest assured that unless the present system of management be quickly changed Great Laxey will not continue to occupy a place in the Dividend List. If it be really true—and as the statement is made by Mr. Ingram, a Laxey shareholder, we may suppose that it is true—that, as *banker* of the company, Mr. Dumbell charges the company 6 or 7 per cent. interest on the money drawn for carrying on the mine, whilst as *chairman* of the company he has ore bills in hand which could be discounted, and would provide the funds required; I say that the greater part of this 6 or 7 per cent. could be recovered, with very little assistance, from the Court of Chancery. If Dumbell, the banker, takes 6 per cent. interest on 7243*l.*, whilst Dumbell, the chairman, has 15,000*l.* worth of ore bills in hand, I do not believe any court of justice would sanction the charge, and the court might also endeavour to diminish Mr. Dumbell's risible faculties, which were so prominent at the meeting. At all events, the mode of dealing with ore bills, the rates at which they are discounted, and the reason that Mr. Dumbell, as chairman, is compelled to borrow at high interest from Mr. Dumbell as banker, should be publicly explained, as no attempt to laugh the matter off will satisfy men of business who are determined that they will have their fair rate of dividends, and that the mine shall be carried on without any chicanery.

Correspondents who appear to be competent to write upon the question assert that the Laxey banking account gives an insular bank such an opportunity of getting its notes into circulation that it would be kept by either of the other insular banks at a mere nominal rate, and that, in fact, it would pay them to keep it for nothing. Manx banks, it appears, issue notes, and this account gives them an advantage that it would not give to an English one. The company is also placed at a great disadvantage, owing to the extreme unpopularity of the chairman with the miners, and it would be well for shareholders to consider whether the evil arising from this does not more than compensate for the supposed advantage of having a resident director. The miners complain that in referring to their wages Mr. Dumbell, as chairman of the recent meeting, did not state the matter fairly, and thereby did great injustice to themselves and to Capt. Polglase. They admit that some earned the high wages stated, but say by way of set off that during the same months others like the tribute system—a system always alike satisfactory to the miners and mine adventurers—was introduced, and that it was that made the men do more work, and thus give the shareholders more profit. Indeed, it is generally felt that in the little battle at the meeting between Mr. Dumbell and Capt. Polglase the former certainly came off second-best, and many think that the removal of Capt. Polglase—for it is a removal, and not a resignation, since his position was made so uncomfortable that he could not hold it—is one that will long be regretted by the shareholders.

But it is of little utility to speak of the probable result of the removal of Capt. Polglase, now that he has ceased to have control of the mine, and that his successor is appointed; yet we have a remedy for future difficulties and disturbances, if the shareholders generally chose to apply it. Let a meeting be called, and a committee of investigation appointed to report fully upon the whole affairs of the company, and the conduct of the directors. The English directors would court this enquiry, and when the report has been made Mr. Peter Watson, or some other equally competent and independent member of the English portion of the shareholders, be appointed chairman of the company, and the chief office be transferred to England. Let the manager at the mines then be required to communicate only with the English board, and the banking account placed in more disinterested hands, and I do not doubt that the result will be vastly increased dividends, and that the shares will enjoy a better position in the market.—*London, Oct.* 15. ANGLO-MANX.

MINE MANAGEMENT—BALANCE-SHEETS—No. II.

SIR,—As I think my letter, published in your columns last week, was taken in the spirit wished—the advancement of legitimate mining—I take the liberty of troubling you with a few other remarks which may be made as opportunely, and with I trust the same effect. I am a small shareholder in Gawton, and have appreciated the candid manner in which the affairs at this mine have been carried on, and believe the committee and secretary to be practical business men; this added to my astonishment at the financial statement sent out to the proprietors, which came to my hand on the 11th inst. The meeting was held Oct. 8, and the accounts exhibited a credit balance of 514*l.* 16*s.* 4*d.*, arrived at, by charging the cost only to June 21, omitting three months, and placing 386*l.* 17*s.* (called in statement, "Cash paid on account of labour cost to August 16") as an asset, with copper ore sold September 26, and sampled 31st. The ore credited is, no doubt, correct, and little can be said if the debit had the three months' cost previously mentioned. If these remarks should cause annoyance I can only express my regret, but having determined to benefit, if practicable, mining industry on this point it is impossible for me to pass over a statement so incorrect, and doing injustice to a legitimate and promising property. To many of your readers who have held shares in a concern drawn into the Stannaries Court it must have been a source of surprise why a company apparently with only few debts should be subjected to heavy and repeated calls. I do not like the proceedings of the Court, and I may assign two reasons for the demands usually made—first, a mine in liquidation possesses many proprietors who are unable to pay, thus the burden must be borne by the solvent, on whom it falls heavily; and second, when liquidation is decided on, compelled, back debts, previously unknown to the shareholders, appear, simply because the purser has not the correctness and courage to keep a close book. Upon the subject of merchants' bills and supplies to mines, I hope to write a few lines next week; but to return to balance-sheets, under the Limited Liability Act it is generally compulsory on the part of managers to furnish under the several heads, particulars of expenditure. Why not also the case with the Cost-book System? It is only fair the shareholder should know how every pound of his investment is expended; he can see what salaries officials are obtaining, and that the several operations are being carried on economically.

Now if we turn to the Cost-book System of accounts, we have—Labour pay, 300*l.*; bills, 100*l.*, representing one month's cost. So we may say, quite enough to place totals in a statement, but I maintain it is not. Instead of the foregoing, suppose we have (for example) shaft sinking, level drivings stoping, tribute, wages agency, with tradesmen's bills for timber, powder, candles, leather, &c., and the amount expended against them. Is this affording the shareholders (with whose means the property is being worked) too much information? It is an excellent check; in every department proprietors would know the charge, and it might frequently save many pounds in the administration. If those who are entrusted with the management of mining companies would consult the interest of the stockholder much distrust would vanish. What is required is a more practical application, a diffusion of correct and general information. Peculiar qualifications are required for the management of a mine; in many cases a large proportion of losses may be traced to recklessness and extravagance, and perhaps some may fear that minute details would open the eyes of the shareholders too wide. Letters may be published, but the feeble efforts made will avail but little if managers still persist in their old grooves, and are indifferent to the future prosperity of mining. One cannot be indifferent, but feel an interest in the altered fortunes of Carn Brea and Wheal Seton, consequent upon the management of Capt. Teague, at the large sums he has made by sales of metal (when sales were few); and having the greatest respect for that gentleman, shareholders would hail his coming to the front, showing correct statements of accounts with satisfaction. He would still pay dividends, and raise to himself a fame and the grateful thanks of mining proprietors. In conclusion, to those who think I am attaching too much importance to this subject, I will give the words of a friend who has made mining pay—"When wishing to invest, I never ventured without seeing a balance-sheet; and if close accounts were kept, and real mining carried on, I made money; but when the contrary, I sold, and so saved. Accounts in arrear ultimately meant setting straight in the Stannary Court, with all its sequences." E. J. BARTLETT.

30, *Great St. Helen's, London, Oct.* 15.

MINING IN NORTH WALES, AND ITS PROSPECTS.

SIR,—In replying to "Cymro's" characteristic effusion in the Supplement to last week's Journal, I may be permitted to say that if the elements of convenience are what I take them to be, he has a very peculiar manner of appropriating them. So far as convenience is concerned in the matter of debate, it has always appeared to me that it is much more convenient to ask questions than to answer them. I do not say this by way of evading the questions he has asked of me, but because he insinuates that I, instead of answering him, galloped off, and scrambled into unwarrantable regions, &c. The similitude between "galloping off," "and scrambling into," conveys a very pretty idea, and shows the gentleman to be intimately conversant with the proprieties and flexibility of language. I regarded Cymro's appearance on the scene as the voluntary champion of a little clique, who considered themselves too feeble to do battle on their own account, and, therefore, I made the signing of his proper name a condition of my giving him the information he asked for; but instead of complying with the conditions I thought proper to impose, he displays a large amount of valour by betaking himself beyond range, and then shouting defiance from behind the rampart. Anonymous to his opponent in the field armed *cap-a-pie* for the conflict, and who only awaits a proper opportunity to strike home. There ought not to be anything personal in the discussion of scientific subjects; they are of public interest, and their discussion should be with a view to mutual edification and improvement.

If "Cymro" were actuated by proper motives, and he has been a diligent and successful seeker of geological knowledge in this highly entertaining district for 37 years, I can see no reason whatever why he should wish to conceal his name, especially when I make, as I

ave an undoubted right to do, the giving it a *sine qua non* of my rnishing the information he asked me for; and why did he allow r weeks to elapse from the time my letter was published on Aug. 16, d the appearance of his exceptions on Sept. 27? You, Sir, cer- inly know, but my impression is that he was not a subscriber for e Journal at that time, if even he is now. I so judge by the pre- story remarks with which he introduced himself into the arena of rife. In addressing you in the first instance, he said, "My atten- on was drawn to a letter," &c., six weeks after its publication. is mode of expression does not in my opinion convey the idea at he acted from his own volition in the matter. It is proper that should notice this, as in his last letter he positively affirms that had nothing whatever to do with the parties who admittedly k umbrage at some remarks contained in my letters concerning Mining in North Wales, and its Prospects." Again, how much more compatible with one's ideas of the kindling enthusiasm of ological enquirers after truth would have been "Cymro's" conduct when he had read my letters he resolved to investigate the phe- menon which gave rise to what he pretends appeared to him rtling assertions; the spot indication is within an hour's walk of s place of residence, if I am correctly informed concerning it. I sh it to be distinctly understood that I am not indulging in platti- les for the purpose of avoiding the questions at issue, as I am te prepared to answer them under proper conditions, one of which that a professed geologist of 37 years standing, who publicly llenges me, shall meet me for discussion of facts pertaining ex- sively to geology upon a fair and level platform. I am only ious in this request to divest error of its assumed regalia of truth nder that the Journal readers may be able to distinguish between at is real and what is fictitious as it respects antagonistic posi- ns. I am fully justified in enforcing this condition as remarks elled in by this writer in Supplement to last week's Journal in- ctes falsehood. He says, "as to practical mining, I think it would as well to leave that subject in abeyance until Capt. Knapp has ted a different course of mining to those who preceded him." ference to this singular paragraph, perhaps the best I can say at I solemnly believe that "Cymro" knows as well as I do that n the first hour of my taking charge of the mine it has been ked in such a way as those who preceded me were utterly in- mpetent to do, whatever means they might have had. As to any rtling assertions which he assumes that I have made regarding value of the mines, and which he expresses himself with a sort dubious hope that "I may be able to prove true," I have only to that if correctly reporting the improvements which have taken e since I have been here has startled anyone I am unintentionally fty; but I stand prepared to prove the startling assertions true.

Llanrwst, Oct. 14. ROBT. KNAPP.

LLANRWST LEAD MINES.

R,—The concluding paragragh of my report on the above mines, ich was published in the *Mining Journal* of Saturday last, appears me to be quite unintelligable, and I will, therefore, thank you to w me to correct it. Referring to the successful opening of the e, I said that, "No previous success I had ever met with had oc- sioned me less anxiety; or, on the other hand, afforded me so ch pleasure as the opening of this mine had done." And then mediately added, "There are sometimes conditions in mining ich enable one to rely as implicitly upon the results of future de- lopments as if such results were logically or otherwise previously monstrable," "and such conditions are here." ROBT. KNAPP.

Llanrwst, Oct. 14.

WHEAL CREBOR, AND CROWNDALE.

R,—Your correspondent, who signs himself "Fairness," has writ- a long letter and taken a great deal of trouble to avoid the real nt at issue. He says "Wheal Crebor surely cannot be injured by being widely known that it has a course of ore valued at 120*l.* per hom." But the statement in the Crowndale prospectus to which reption was taken by me was that this lode worth 120*l.* per hom was "only a few fathoms from the boundary," which, being rely untrue, was calculated, if left uncontradicted, to do serious ury to the Wheal Crebor shareholders, and to mislead those who ght join the Crowndale upon the strength of it. ARGUS.

TREGARDOCK GREAT LODE.

R,—I did not intend to trouble you again on this subject, but I omitted a few remarks in my last letter, which has induced again to trouble you. Many of the readers of your most valuable rnal, no doubt, can remember Mr. Ennor's statement of a winze k by me in the bottom of a level, in which level he says I had ied out to the North Sea. I think Mr. Ennor professes himself to be somewhat engineer. Permit me, then, to ask him this question—What size cylinder me would Mr. Ennor advise to keep the water out of the winze, and what size mps to keep dry the north channel, so as to enable this winze to haul to the world? If I mistake not, the mining term winze is to sink to haul to a level; e, of course, is a substitute for a shaft. Now, if I had hauled my level to the , I must sink my winze to haul to a level underneath the sea. Will Mr. Ennor me the nearest town in the new world my winze would haul to, because if level were driven out to the sea by all above what level can I haul my winze to ept it is to the new world? This is a shocking way of getting rid of his mis- s. It is an old saying that a drowning man will catch at a straw. Now, Mr. itor, the truth is this level was never hauled to the sea at all. At present it is fms. from it, and where the winze was sunk in the bottom of the level it was fms. in from the side of the cliff, at which point there was a cross cut driven rly at high-water mark to intersect the lode we are now driving on, and at ring tides we found the sea would rise by these cross-cuts, driven, no doubt, hun- ds of years since, and found by sinking a winze to haul to this cross-cut it would a great advantage for ventilation in driving the present level, as well as to take the deals from the level we are now driving. I have no wish, and, indeed, it is my nature, to give insult to anyone, and I regret that Mr. Ennor should give this task called for by no one but himself; in fact, he had no authority ntever to bring this mine before the public. I have just seen your valuable rnal of Sept. 27. I again notice a long letter from him, by which it appears my letter was a cordial too peppery for his palate. Rebuke a wise man in his r, and he would thank you; not so with Mr. N. Ennor. But true it is when ide, ignorance, and envy are established in the heart of an uncultivated man there no earthly chemist who can find a cor tial strong enough to eradicate that evil. at give a dog rope enough, and he will hang himself. His own letters will show ignorance and malice. The very question I put to him in my last letter he ems to forget, and in his last he asks seven questions that no sane or sensible an would attempt to answer. In the first place, he says I had quarrelled with e north channel, which sent one of its foaming billows, and knocked off the ur of my shaft, and swept away my whim-round. Now, common sense will once convince your readers of the absurdity of such a statement—as deliberate a lehood as ever man could utter. I have taken up the adit 6 ft. above high-water rk, which the highest tides have never reached; and the shaft he speaks of is fms. above the level. I do not believe in miracles, but should the sea have in- ced it would have swamped Port Isaac, Boscastle, and many other towns—in- ed, it is useless to notice such an unmanly expression. The fact is, he is alto- ther wrong: but in one of his letters he remarked that he has been called upon ur times to inspect this mine, and to give his plan of working. It is strange that ither of the four agents could fall in with his plans; perhaps they have heard of me Mr. N. Ennor that was once the manager for a short time of a mine, I think led Ashburton United. I do not know whether I am correct in the name, neither m I sure whether it is the same Mr. N. Ennor; but, be this as it may, they had t up their engine near the shaft, the main bob was long enough to reach another ft if it were sunk 9 ft. from the present one, and I am informed that Mr. J. bbins, after inspecting the mine, called a meeting of the shareholders, to de- rmine which was the most advisable plan, whether to remove the engine-house m the shaft or the shaft from the engine-house. Surely, it could not have en my opponent who committed such a blunder as this. I will now ask Mr. nnor whether he remembers meeting a gentleman from Leeds and Capt. Doidge the mine, and what brought them there? Why, Sir, it was one of the similar tters he has written which has caused me to contradict that I was driving on the rong lode, that I had hauled my level to the sea, that the lode or branch which I as driving on had no part or parcel with the large lode he refers to, and that it ould cross the No. 1 adit 10 fms. in from its mouth. Seeing this letter, these gen- emen from Leeds were induced to come down, and see for themselves whether ere was any truth in this statement. When on the spot they enquired of Mr. nnor what lode we were driving on, if it was not the main lode. He was then alking on the beach, and he scraped away the sand with his stick, and showed em a small branch, and stated that it was a lode. Capt. Doidge, hearing this expression, gave vent to his feelings by a burst of laughter, while these Leeds gen- emen put the question again to Mr. Ennor—"Do you mean to tell us that the lode we are now driving on is the branch we are now standing upon, and that it will rop out 10 fms. in the mouth of that level there?" pointing to the mouth of No. 1 dit? Mr. Ennor said it was. On hearing this, the gentlemen got out of temper, nd left Mr. Ennor with his assistant on the sandy beach. Now, Sir, this is equally s absurd as though you and your friend were standing on London Bridge, with your faces towards Blackfriars, and your friend should turn around to you and say, I will swear that we are both standing on Blackfriars." As to the dialling, every- one that knows the use of a dial knows fully well that it is a useless instrument at surface except to take the longitudinal bearing of a lode. When seen pick and shovel in the best dial. There are only three lines required on a plan or map to show three lodes, and there are only three lodes visible in this property. One only runs 60 fms. before it forms a junction with the other, No. 2, which is the main lode. Now, Mr. Ennor in his last letter forgot himself. He acknowledges that what we are driving on is a part or split from the main lode, which is proved to run only 60 fms. inland from the face of the cliff before it runs into the lode we are driving on: but in his former letter he states that we had hauled it out to the sea, and that it was on the beach, and crossed the No. 1 adit. Now, Sir, would it not be useless to notice anything more he writes? I have finished with such a novice in mining, and it is a great pity that he should bother himself about matters that he does not understand. I have had 28 years' practice of a dial, and had the whole control of sinking shafts, winzes, rises, and levels, and was never charged with any mistake; and I may here remark that this mine has been mapped off and beautifully done, with the lodes laid down on it, by Mr. E. Gledhill, of Shrewsbury, who is a professional mapper and dialler. It has since been done by my son, Capt. George Spargo, of Brynambor Mine, South Wales, who also is a professional mapper and dialler. The mine had been inspected by eight practical mine agents, all of whom advise the driving of our present level, No. 2, to the junction, considered by the whole of them to be the main lode: but your correspondent, Mr. Ennor, has confidence enough in himself to think he knows more of mining than the whole eight. This will speak for itself. J. SPARGO.

GAWTON COPPER MINE, AND ITS MANAGEMENT.

SIR,—I wish to ask permission through the Journal to direct the attention of the shareholders to what appears to be the present unfavourable condition of this mine. And, first, I would refer to the unsatisfactory balance-sheet forwarded to shareholders a few days after the meeting held on October 8 (meetings were formerly held every three months, not five). In the statement circulated at that date the costs of the mine are only charged up to June 21, and, as represented, leaves a balance of 514*l.* in favour of the mine. This I contend is a most incorrect return. In the account of "assets and liabilities," attached to the statement, there appears in the former a charge of "cash paid on account of labour cost to August 16, 386*l.* 17s.," but where is the charge for liabilities for this labour cost, &c., to that date?

We have no debit entry whatever later than labour pay to June 21, and yet the copper sale on Sept. 26 of 499*l.* 10s. 9d., and sampled ore (unsold) valued at 550*l.* appears to the credit. There is at least two months labour pay and bills which should have been added to the liabilities, and this average debit, making the four months, would have increased 756*l.* to the liabilities, and left a balance of nearly 250*l.* against the mine, not the incorrect imaginary one of 514*l.* in favour.

Whilst on these accounts, however, I would recommend to shareholders in future to insist on the financial statement and agent's report being forwarded with the notice convening the meeting. There will be opportunity then to consider and bring forward any matters requiring explanation at the meeting. Under the present system shareholders have to listen to the hurried reading of a manuscript statement by the secretary, which when finished, some other subject is at once introduced tending to bring the meeting to a close as soon as possible.

A word or two as to the management at the mine. My candid opinion is that in the matter of agents, one efficient and practical man would, without the least pressure, be capable of looking after the hands employed at Gawton. I see the elder Captain Rowe has two or three other mine appointments in the vicinity, and cannot, therefore, give Gawton much of his personal attention. There appears also some difficulty in the way of settling with Lord Mount Edgcome for the western part of the sett. This the committee stated on May 1 would be decided in a few days. Five months afterwards and it yet appears no nearer a satisfactory arrangement. My own impression is that it would be highly desirable, before it is too late, to have the mine inspected by some competent local agent, and to appoint on the committee parties (shareholders) who have at least some knowledge of mining. I write with all deference and respect for the present committee, but from what I have seen at numerous meetings of Gawton Mine, they are not over well acquainted with mining matters.

Rely on it, it is time to make a move in the proper direction here, and I hope the shareholders generally will attend to it. The mine is a promising one, but all will be speedily sacrificed unless a radical change takes place in the management throughout.—*London, Oct.* 15. A SHAREHOLDER.

MINING IN BREAGE—WHEAL FANNY.

SIR,—Not having seen this mine referred to in any way in the columns of your valuable Journal, and knowing that you are ever ready to convey any pleasing intelligence in reference to Cornish mining, particularly at this time, when a great number of our large mines are weighed down with the great expense attending their working by the means of the high prices of coal, iron, &c., I am very proud, for the good of mining generally, to be able to give you a little information on the results attending the operations at this mine, and the success which most assuredly awaits a more extensive development of the undertaking. The mine is situate on the south of Tregoning Hill, in the parish of Breage—a mining district which needs no comment from me to show to many of your readers that it is, or has proved, one of immense wealth in tin mining. The channel of ground in this mine is granite of an easy nature for working, and which, as has usually been found in tin-bearing districts, is the right kind for the production of that mineral.

I think operations first began here about the commencement of this year by, I should say (looking at the quiet way it has been carried on), some private parties. Since that time a small trial engine has been set to work, and the engine-shaft sunk 10 fathoms below the adit level. I ought to here remark that this grant is entirely virgin, or unwrought, mining ground, so that the mine commenced at the surface with the present party. The lode on which the engine is erected, I am informed, varies from 2 to 4 ft. wide, and there is no reason to doubt this, looking at the large quantity of tinstone already brought to surface, considering the time at work, and the extent of ground opened to yield it. As far as the quantity goes, I have had ample opportunities of seeing it tested, and every bit of the stuff now coming to surface will pay well to return on the mine, and some of it is rich. It is rather surprising, and quite beyond the capacity of mines generally, to see such large heaps of lodestuff at surface from the short extent of ground opened; and I would here state that in crossing the mine (which I have very frequently to do) I observe the greatest attention, care, and economy are practised in everything, and I believe everyone employed has the welfare of the undertaking at heart. The whole of the produce I find is daily tested as raised to surface, which I have been privileged to see done myself on several occasions, and which I believe is giving great satisfaction to the manager; and from my own judgment, having had 40 years' experience in tin mining, I have no hesitation in saying that this is the best new mine opened in the district for the past 30 years. If the lodestuff coming to surface every day is to be taken as a guide, this is a profitable mine as soon as dressing machinery can be got ready to return the tin.

I before said the working of Wheal Fanny is done in a quiet manner; whether by private parties or otherwise, there is no puffing about the matter, shares quoting at a high premium, nor selling at an immense market price; but I have no doubt if this mine were in the hands of those termed the knowing ones they would have made a great feast of it ere this, for if they do it on many of the mines brought forward where in reality there is nothing of value to be seen what would they do with a little mine of this description? This, however, appears to be an exception, and I am glad of it in the interest of legitimate mining. We see no flaring reports here, nor jobbing or brokering the shares: and I have heard the agent say to the miners more than once, when the latter were speaking very high of the value of the lode, not to speak too highly; he would rather they spoke under than over; that he wanted no puffing, and that in a short time the returns to the smelting-house would speak for themselves better than anything they might say at present. I am much pleased with the honest way, to all appearance, of doing things here, and the prospect of the mine speaks for itself, which can be proved by any practical miner; and it will be well for those who intend to spend capital in mining to look to this for an example, particularly at the present time, and price of mining materials and coal. Old and deep mines are very expensive to work now, even if they have good lodes at the bottom to work upon, and to re-work old mines at this time, in my opinion, is folly in the extreme. I advise, like the Wheal Fanny, new pieces of virgin ground be searched out in good districts, where at most a small capital will be sufficient for all purposes, and not one tenth the expenditure in machinery and in keeping the mine going afterwards. One steam-engine in a new mine is equal to half-a-dozen in an old deep mine, and there is the expense in coal to keep them at work. If people would have a little more care in the choice of their mining undertakings we should hear very little complaints as to their bad speculations: and, like Wheal Fanny, satisfy themselves by the expenditure of a few hundred pounds that they have a property that warrants the expenditure of additional capital for the more effectual working of it with the necessary machinery for pumping, stamping, and dressing purposes, which I hear is now about to be put up here forthwith.

I had almost forgotten to say that the Wheal Fanny sett is traversed by lodes and cross-courses in all directions. There is a cross lode no great distance west of the engine-shaft, and at the junction of this and the engine lode no doubt a rich course of tin will be found. The 10 is now being driven west towards it, and I hear the lode improves as it goes west, and I shall not be surprised any day to find it cut rich. I remember this sett being applied for by three different parties, but the then steward would not grant it, and it seems somewhat providential that it should be held back until now, a time when most needed by the inhabitants of the neighbourhood, and when old mines are being wound up, and work is required. I wish the Wheal Fanny, and all such undertakings, abundant success.

Breage, Oct. 15. RAMBLER.

WHEAL VINCENT TIN MINE (ALTARNUN).

SIR,—Two letters appeared in the Supplement to the Journal of Oct. 4, written, it would seem, in reply to mine of the previous week, but neither of them has enlightened me on the subject to which I alluded in my letter, nor gave me any information on the chief point at issue—the proper reason to be assigned for the non-fulfilment of the promises made by the agents in their previous reports. I must, therefore, still adhere to the opinion which I previously expressed, and consider it to be owing to one of the causes which I adverted to in my former letter, and if this point is conceded then I think there can scarcely be two opinions as to the course which should be adopted by the shareholders; for if the present depressed state of the mine is owing to mismanagement, there seems to be no alternative left to the shareholders but to endeavour to secure better men to manage the mine, and if it is owing to the falling off of the tin-producing points, then the sooner we abandon the mine the better, so that we may stop making calls.

I would now make a remark or two in reference to the two letters referred to. In the first of these "Shareholder" says he is not dispose to show "the white feather," thereby intimating, I presume, that I wish to play the coward by proposing to abandon the mine. Allow me, therefore, to say, Sir, that I am quite willing to bear my share of the burden so long as there is any chance of success, but I am not one of those who are disposed to spend money recklessly when there is no possible chance of being remunerated for the outlay. "Shareholder" also says that he has been underground at Wheal Vincent, and has seen that the ends are being driven and the different stopes operated upon, and everything being done in a "miner-like way." This, in itself, is no proof of good management, for it is absolutely necessary if a mine is worked at all with a view to its proper development that these things should be done, but as "Shareholder" appears to be perfectly familiar with what has been done underground at Wheal Vincent, perhaps he may be able to take the amount of work done in the aggregate, and allow a fair price for the performance of such work, and then tell me what proportion it bears to the amount which we have actually paid for doing the same.

"Shareholder" also says that he has heard practical men say that there is nothing to complain of in the management of Wheal Vincent; I would, therefore, inform him that I have also heard practical men condemn it, and in some cases they have expressed their dissatisfaction in the written reports which they have submitted to their clients. "Who shall decide when doctors disagree?" There is also another statement in "Shareholder's" letter which appears to me somewhat paradoxical, for he says the agents in Wheal Vincent "know tin when they see it," but they "cannot see it where it is not." This statement appears to be suggestive of two things; for it implies, in the first place, that a great change had taken in the visual organs of the agents of Wheal Vincent, for when we compare their previous reports, and the high value set upon the different stopes, with the present state of the mine, we can come to no other conclusion than this—That the agents must have seen tin where it was not, and it also implies that there is no tin in Wheal Vincent at the present time for them to sell. Query—Which does "Sharcholder" imply by the statement referred to?

Referring to Capt. Gifford's letter, I must decline to accept the invitation which he gives me to come to the mine, for, in the first place, I do not think the visit to the mine would be sufficiently remunerative to reimburse me for the expenses which would be necessarily incurred by the journey; neither do I think a mere cursory inspection of the mine and the operations underground would be a sufficient test of the management. It should not be an experience of an hour or so to enable a person to come to a correct conclusion in this matter, but it might be arrived at by a connection with the mine, and an experience extending over some months, as many of the shareholders have found to their cost.

Capt. Gifford accuses me of strongly condemning the management of the mine, and I as strongly deny that there was anything in my first letter which would warrant him in making such a statement; I did not charge him or anyone else particularly with the mismanagement, and for aught he knew to the contrary I might have alluded to the committee, and not to the agents. I would, therefore, take this opportunity to say that at the meetings which I have attended I have discovered that there is a strong element of discord in the committee, and that they did not work harmoniously together, and I think it would be very desirable at the next meeting to infuse some new blood into it. A man may represent a large number of shares, but he is not the better man for the committee on that account, for it does not necessarily follow because a man holds a large number of shares that all knowledge must be concentrated in himself. You know the old adage, that if we load a certain beast with gold he does not undergo any natural change, but he remains the same beast still. Seeing, then, that Capt. Gifford has so grossly perverted the truth, and has made statements which he was not warranted in making, I think he is the man most to be avoided, for he has certainly proved himself to be the most dangerous man. SHAREHOLDER.

EAST LOVELL, AND ITS MANAGEMENT.

SIR,—As a shareholder in this mine, I notice the various letters respecting the management, more particularly that of Mr. E. J. Bartlett, in the Supplement to last week's Journal. Now that the prices of coals, timber, iron, and other materials are so excessively high, economy ought to be the order of the day. Why not stop the losing part of the sett, and stick to the part which has and will, no doubt, in future pay a profit to the adventurers? At present the lords, merchants, and agents take all the cream, and the poor adventurer gets nothing: these gentlemen in power should meet the difficulty at once, and put a stop to the accruing losses until the supplies to mines get cheaper, and then resume operations if prospects justify the outlay. At this time of the year the merchants supply coals as much like mud as coals, but well-regulated companies import their own coals, a saving of something very considerable, as everybody knows who venture in mines where steam-power is so expensive as at present. Agencies are fixed at meetings when mines are paying dividends, but an abatement ought to be made when mines become poor, and calls are made.—*Oct.* 14. AN ADVENTURER.

EAST LOVELL TIN MINE.

SIR,—There is a chorus of vague complaint as to the management of this mine. I hold 10 shares, and after reading the report of Aug. 29, I was thankful that instead of making a call the management had determined to carry on the works without doing so. The meeting thought so too. An exceptional time had passed, profit on Fatwork had gone to develope Tregonebris, a second mine. In fact, the report states clearly that the latter is now paying its way. The report said that credit (to 500*l.*) had been taken for tin in stock, and which the manager since says has been sold at a better price. Times are very bad for mine shareholders—so far as East Lovell is concerned they will not be improved by the letters I have referred to.—*Reading, Oct.* 13. B.

ENGLISH MINING—ITS PRESENT AND FUTURE.

SIR,—Is Mr. Barnard right this time? I ask the question, for when no one else can rush into print without bringing a hornet's nest about their heads in the shape of stinging replies, Mr. Barnard invariably says what he chooses, and no one seems to contradict him. Perhaps if he had had more opposition his pen might have been less active, and the tens of thousands of pounds he says he has raised have been in the pockets of their former owners, instead of lost in his mines: he seems to have done himself no good, and caused great loss to many. I have no desire to throw cold water upon his efforts to advance English mining, and his letter of last week appears so straightforward and clear that I should like to hear what the practical mining captains have to say about it. I am quite prepared to learn that it is all a myth; and, on the other hand, I should not be surprised if Mr. Barnard turned English mining, as a whole, from a miserable failure into a great success.

Oct. 13. FAIR PLAY.

ENGLISH MINING—ITS PRESENT AND FUTURE.

SIR,—I have read the Journal for many years, but never have I seen a more sensible, fair, and practical, and I may add amusing, letter than the one which appeared in the Supplement to last week's Journal, signed Thos. J. Barnard. He does seem so genuine, and his writings are so fresh, that I do not wonder at his having raised tens of thousands of pounds as he says. I do not know much of practical mining, and my opinion may, therefore, be valueless, but Mr. Barnard's letter certainly shows the dark and bright side of English mining, and from my very little experience in practice but extensive readings upon mining matters, I should say that he has hit the right nail upon the head, and if so he will do mining untold good. I hope to see a controversy brought forward upon this most important matter, and it will afford me great pleasure to read the remarks made by practical men upon the subject; and, in reply to Mr. Barnard's letter, if he has found a mare's nest for the welfare of the public, and speaking very calmly, his error ought to be pointed out to him, as his writings, which appear so genuine, may only lead others astray. I shall watch with interest any letters upon this important subject of treating low-class silver and copper ores. LOOKER-ON.

Bristol, Oct. 15.

ENGLISH MINING—ITS PRESENT AND FUTURE.

SIR,—I know nothing about chemistry, but have been connected with mining for 40 years, and if Mr. Barnard can do what he says he will make the fortunes of half of our copper mines that are now working at a loss. If all he wants is 1 per cent. copper he can have any quantity of 1 to 2 per cent. I cannot say so much for 6 oz. of silver; I have in my time had hundreds of assays made, but the average is not more than 3 to 4 ozs. per ton, but some mines are much richer for silver than others. Thousands of pounds worth of copper go down the rivers annually in dressing operations, and if Mr. Barnard carries his theories into practice he will deserve the blessing of every mining man: whether he can or will do so I am not competent to say, but I would rather see than hear tell of it. Great changes have come to pass the last 50 years, and perhaps the next 50 years will see stronger miracles.

Liskeard, Oct. 11. OLD MINER.

ENGLISH MINING—ITS PRESENT AND FUTURE.

SIR,—In his last communication to the *Mining Journal* Mr. Barnard makes the following statement, amongst very many others of a similar kind:—"I maintain (he says) that the copper lodes hitherto found in England—that is, the whole mineralised matter contained in the lodes—will average 1 per cent. of copper and 6 oz. of silver per ton." For the information of your readers Mr. Barnard will, perhaps, be good enough to give the name of just one copper mine in the whole of the district in which he is at present located that will give such a result.

Oct. 14. OBSERVER.

WHEAL MARY.

SIR,—I am glad to see that the attention of the mining public has been drawn to the above concern by a writer in last week's Journal. Is it not monstrous that Wheal Mary should be quoted at 50,000*l.*, a larger sum than either Wheal Seton or Wheal Kitty, two mines which are under first-rate management, and paying regular dividends? Judging from the reports in the Journal it can scarcely lay claim to the title af a mine, but seems to be merely an open cutting, without shafts, levels, or winzes. How can such a concern be worth 50,000*l.*? Then look at the district; a district of constant failures—the home of Hammett, Reperry, Castle Dinas, Terras, and many other such concerns. I have no shares in that part of Cornwall, but am a shareholder in many mines in other parts, and find that when mines come to grief which ought never to have been started, *bona fide* mines suffer with them. This must be my excuse, then, for writing on this subject. CAUTION.

EAST VAN MINE.

SIR,—This undertaking, which commenced some time since, under such good auspices, has apparently proved a failure. Month after month exhibits the old stereotyped report from the manager. I have received no intimation of any general meeting for this year, and it is considered by many shareholders that they should be enlightened as to the real state of the case. I think Capt. Williams, who has hitherto borne a high reputation as the discoverer of the great Van lode, would be merely doing himself justice were he to state distinctly in your valuable Journal his sincere opinion of the prospects of the mine, at the same time giving a more ample sketch of the present workings and the plan of action he intends to adopt. Perhaps, also, the directors would be good enough to state the amount of still available capital in their hands. There appears to be a strange desire for reticence among all parties concerned. A CONSIDERABLE SHAREHOLDER.

MINING IN SHROPSHIRE—NORTH TANKERVILLE MINE.

SIR,—Being largely interested in this and other mines in the Shropshire district, please allow me to ask the opinion of the officers of management of this mine as to our future prospects and ultimate chances for good or otherwise. Seeing the apparent disparity—the ebbing and flowing of hopes and fears caused by the varied reports issued for our guidance, I have been led to enquire into the merits of the property, and the practical way of working the same—and, unfortunately, I hear the whisper of non-success, and possible abandonment of the mine, which has been, as is said, fully proved, and is worthless. I hope this is untrue, both for the credit of the board of management, officers, and agents herein, and of the able and practical men who courted our embarkation of capital as an investment, and not a speculation. See the early and late reports, compare their contrast, weigh their merits, and I fear the tale may soon be told (alike with other properties, or, must I say, schemes)—inefficiency or incapacity, or may be a perversion for other purposes. Most of the practical miners of the district speak highly in opinion confirmatory of its high merit, but woefully as to its mode of working, and of the trials being made. If these statements be true, and the reason for them be allowed to exist, I presume the shareholders will shortly have to suffer the penalty of a total sacrifice and eat the leek of submission to the present powers. Further, I am assured there is ore discovered and exists; but no one must touch, taste, or handle. Why is this? Can it be true? Is it known at head-quarters? If true, why so much silence, and is there not a demand for enquiry? If false, will the agent on the mine, in whom we put our trust, give such value a denial in the face of the opinions given and rumours extant, that we may judge the same or otherwise? I opine every shareholder should now look to their

interests ere it be too late. I have been comforted by former reports, being led to hope much, but by the late ones I am taken aback, and am in wonder how practical mine agents can so suddenly change their opinions, if I may call it a change, unless with due reason, and which in all honesty they should adduce when capital is involved, and when so, praise can be needed; though I trust this will open an enquiry, bring out the truth or falsity of the rumours which are various, and afford to other distant shareholders a knowledge of our good or evil for our pains; or the writer must again subscribe himself, with others, AN INTERESTED VICTIM.

Guildsfield, Oct. 16.

P.S.—May I hope some one residing in the district will enlighten us?

FINANCE, AND ADVANCED MINING.

SIR,—As I predicted some month or six weeks ago, money has risen in value, and is likely still further to harden as the year advances. The minimum rate of 6 per cent. will not turn the Exchanges so as to cause a reflux of gold to this country; hence, during the ensuing fortnight, and up to the close of November, the rate will probably range to 7, 8, and possibly 10 per cent. The affairs of America are very unsettled, and should a metallic currency be established the money markets of Europe will be greatly disturbed; while, again, the drain for Germany is an element of distrust, that keeps the finance of the "Old Lady of Threadneedle-street" ever sensitive, and subject from day to day to fits of depression, or otherwise unhealthy spasmodic inflation. As to the harvest, and periodical Scotch and provincial drain for domestic purposes, that invariably occurs at this season of the year, another month will rectify, and the Bank experience no further inconvenience from its advancement and temporary use. It is a fact, however, which all will soon have to acknowledge, that money will run high, discount become difficult, and trade contract in volume, while merchants and traders' engagements will mature, and contracts have to be redeemed instead of floated over, as too frequently is the case in times of monetary ease and plethora.

The value of money at St. Petersburgh is 7 per cent., at Paris 5½ per cent., at Vienna, Turin, and Brussels 5 per cent., while at Hamburg and Amsterdam it is fully 4½ per cent. Again, it is hardening at Berlin and Frankfort. The amount of bullion is reduced this week at the Bank of England no less a sum than 1,292,516*l.*, thus reducing the reserve when compared with liabilities to 31½ per cent. The changes in the finance of the Chancellor of the Exchequer are also fearfully interfering with public business, and at a time when it could be least desired a large balance standing to the credit of the Council of India has become absorbed. The radical changes in almost all branches of industry, consequent on reckless and unnecessary interference with almost every branch of industry, have, as deservedly as necessarily, called forth the expression of the nation against the conduct of the present administration. What is required is a Conservative or Tory Government to give confidence and tone to the Legislature of the country.

How will the diminished trade in tin-plates and the monetary crisis in America, coupled with the high price of money, affect the price of tin in this country? Again, what will be the effect of the increased importations of tin ores from Australia? We may assert, over and over again, that tin cannot be raised in Australia to pay the costs; still we cannot close our eyes to the stubborn result—that fully one-third of our home productions is required to equal the exports to this country, received and in transit during the current year. Here is an element in the supply that must exert a great influence on the minds of both smelters and consumers, and so long as the ore is introduced, it is immaterial to them as to whether it pays the miner or not. The argument is equally trite and applicable to our home mines, and we may ask the question with equal propriety, does the production of tin ores in Cornwall pay or not? We answer, at the current prices we apprehend not.

We do not participate in the widely-spread apprehensions that the increased rate of wages and the high prices of fuel will permanently affect our productive, mechanical, mercantile, and commercial superiority. We are not sceptical of the dangers that many entertain, and are wholly ignorant of the nations or communities of artizans, mechanics, and industries that can compete with us, far less undersell us. We do not believe that wages will be permanently raised beyond their just and legitimate level through artificial combinations of workpeople, as we have ever found that the scarcity of hands invariably leads to mechanical inventions and agencies which cheapen production and diminish the volume of labour. Even the coal question may be a blessing in store for us, for who can forshadow the future, or foretel the discoveries it may lead to in the hidden storerooms of the earth. A short time will solve the doubts at issue. Either fuel and the necessaries of life must cheapen, or all the ramifications of labour and the value of its productions must undergo a complete transition. Capital must always command industry, or the coffers of the opulent will be closed.

It is satisfactory, in the face of existing depression in Cornish mining enterprises, to recognise the earnest and sustaining help and countenance extended by Mr. Fox, of Trebah, to *bona fide* and legitimate industry. Mr. Fox and his family have been associated in their infancy and progress with almost every successful adventure now extant in Cornwall, and in him and his supporters now changing the Balmynhear Tin Mining Company from the Cost-Book to the Limited Liability we have an example of advanced enlightenment that others will do well in attaining. The mine is proved a success, the quantity of ores discovered almost unlimited; there is only required additional machinery. He, therefore, creates additional capital under the Acts 1862 and 1867, thus relieving the present proprietary from further contributions, after expending 30,000*l.* on the works, while he admits upon favourable terms the general public into an established property without the possibility of calls.

32, *Fleet-street, Oct.* 16. TREDINNICK AND CO.,
Consulting Mining Engineers, and Dealers in Stocks and Shares.

THE UTAH MINES, AND EX-GOVERNOR STANFORD.

SIR,—Mr. W. E. Surtees appears to be disposed to be angry with me simply because I protected the character of a gentleman whose official position in a great country ought to have secured him an immunity against any unjustifiable attacks. In reply to my, I hope, temperate strictures, Mr. W. E. Surtees (I wish to repeat his name, as he indulged so freely with mine) acknowledges, though somewhat vaguely, that he had made a mistake. In other words, I was right and he wrong. Why not stop there? He professes ignorance of my nationality. What this has to do with the subject I am totally ignorant of. However, to enlighten him I have this day forwarded him a post-card, carefully marked "private and confidential," and trust he will not betray the secret.

Now, with respect to the matter in question, I hope this little passage at arms will teach Mr. W. E. Surtees a lesson—that it is not always safe to attack indiscriminately Tom Snooks or Jack Styles. Mr. W. E. Surtees spoke disparagingly of a gentleman for whom I entertain a most profound regard. Without the slightest communication with ex-Governor Stanford I tilted a lance in his behoof. My opponent was obliged to acknowledge himself in error, but, instead of apologising, as true chivalry would have induced him to do, he simply and, as I opine, somewhat rudely leaves the cause, and attacks the effect. Let Mr. W. E. Surtees bear in mind that all the Governors of States in America are gentlemen accredited by the Executive as men of unimpeachable integrity, and that any person impugning their character casts a reflection upon the governing capacity of one of the greatest, most intellectual, and most highly spirited nations the sun ever shone upon. W. WHITE.

Laboratory and Assay Office, 25, Finsbury-place, E.C., Oct. 15.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—As the writer of the letter so vigorously attacked by Mr. Applegarth last week, I cannot but admire a communication of such length that really says so little, and the little it does say tends to fully confirm that which he pleases to call "libelling a company by inuendo." For instance, Mr. Applegarth exults in the announcement that "instead of borrowing to pay dividends, the Richmond has (he is informed) within the last six weeks paid off 16,000*l.* from the loan account." If this statement be intended as an answer to my "inuendo," it shows that—dividends have been and still are being paid while yet the company is in debt, because if "16,000*l.* has been paid from the loan account," it is obvious that there is an outstanding loan, and that, therefore, the company have borrowed and still owe money, although the directors *are paying dividends.*

Mr. Applegarth is, unquestionably, perfectly correct in his unanswerable statement, "that it is a very absurd as well as unjust thing to assume that because one mine has failed another (500 miles off) must collapse;" but seeing that even greater things were promised and expected from the collapsed mines than from the Richmond, and apparently upon at least as reliable data, why does not Mr. Applegarth adduce some additional evidence beyond a mere general statement to prove that the disappointing results that have already taken place in the one case are not likely to be followed by something similar in the other?—that is, as soon as the vendors shall have placed the whole of their shares upon the market.

Oct. 14. A SHAREHOLDER.

EMMA MINE.

SIR,—We have now had sufficient written against this mine and its management as to become wearisome to the readers of the Journal. All I can say to the existing shareholders is that the mine under the care of Mr. Attwood is making rapid progress for the future development of ores, which, in itself, will cause the shares to gradually become more valuable, and possibly once again reach their par value—20*l.* Do not be led into any lawsuits, but increase your holding according to your means, at current quotations—3⅜*l.* to 3¾*l.*, especially those who have already bought in at high prices This advice may hurt the feelings of parties who have over-sold, yet I firmly believe such a step will greatly benefit the late victims of misfortune.—*City, Oct.* 17. A WELL-WISHER.

THE EMMA MINING COMPANY.

SIR,—The bald, meagre, and inconclusive statements contained in the report of the committee of shareholders, and at the same time their utter irrelevancy with the real object for which we appointed them, have deservedly elicited—to speak mildly—expressions of surprise. After what took place at the last meeting—when such infurlited statements and serious allegations were made—to find such a tame, vapid report, communicating no one fact that you, Sir, had not weeks before published in your columns, not suggesting, nor even indicating, any course whatever for the future, strongly r minds one of the fabled mountain in labour, which brought forth a mouse. Had the committee told as only one fact—the amonnt of profit the mine is realising, and how long it will probably take to free it from debt—many shareholders would know more than they do now. Had they told us that Mr. Park had consented, or was likely to consent, to be paid the amount due to him of 47,000*l.* from the mines' profits, which are now at the rate of 1000*l.* per week, we should have known something from our committee; but as it is, outside shareholders are as much in the dark as heretofore—the past is unrevealed, and the future is beclouded.—*Oct.* 13. X. Y. Z.

THE EMMA MINE.

SIR,—On August 20 last I received a circular from Mr. S. T. Paffard, in which he makes the possible value of the new pocket at 100,000*l.*, and then puts the total value of the Emma Mine at 60,000*l.* Now, Sir, although no mining expert, I claim to some little knowledge of mining results, and I feel quite sure that if the new pocket should really prove worth that sum, or even half of it, then we shall find 20 such pockets, and most likely a regular lode, and which pockets will not be emptied in 20 years. We have only scratched the surface of our very extensive ground as yet, and at the present price of the shares it would only require 20,000*l.* net profit to pay a dividend of 10 per cent.

The Cape Copper Mine, in its early days, was in as bad a plight as the Emma, and most successful mines have had their dark hours. AN ALLOTTEE.

London, Oct. 15.

THE FLAGSTAFF, LAST CHANCE, AND TECOMA MINING COMPANIES.

SIR,—The great regularity and long continuance of the dividends of the Flagstaff not only enabled the vendors, promoters, and directors of the Last Chance and Tecoma to bring out these companies so advantageously to themselves, but, combined with two or three names relied on at any rate as guarantees of integrity, induced even those who were prudent and cautious at length to purchase their shares. In them the clerk, the agent, the receiver at last began to invest their hard-earned savings, and it must be assumed that Mr. G. C. Frames, accepting a seat in the direction of the Flagstaff for a mere 500*l.* a year is not the only bank official who is a shareholder. To such persons credit is life's blood, and they either suffer in silence or some fancy signature faintly whispers their wrongs. No one likes to confess that he has been duped: but, as I happen to so situated as not to care even the value of a share in Colonel Stanford's Tecoma Company for commercial credit, I have thought it due to others, as well as to myself, to write to you, appending my own name. It is admitted that the directory of the Flagstaff has for a long time been raising money (and not from the executed workings of the mine) with which to pay fictitious dividends. There are seven directors, whose salaries of 500*l.* per annum each amounts, when united, to much more than the interest of 100,000*l.* Consols. These directors must either have virtually been borrowing money for the payment of their own salaries, or they must have considered the concern so rotten that it would not bear the weight of their salaries, and not taken them. In either case, was it not monstrous that, up to August last inclusive, they should have continued their high monthly dividends? "But how else," these gentlemen may pathetically ask, "were we to sell our shares?" Let Governor Stanford's brother and Mr. Davis enquire of the clubs and exchanges of New York and London—not of California and Utah—what should have been the conduct of their board.

Commerce has its curiosities as well as literature, and some future historian of these may narrate what vast sums of money have been spent in telegrams and cablegrams between the boards on this side of the Atlantic and Captain Forbes, R.N., and Mr. Maxwell on the other, respecting plans, which, now received, are unintelligible, and accounts which, though often stated to have been forwarded, have not yet arrived. And he may have the impertinent curiosity to investigate whether any director, holding a qualification of some ten shares in these companies of mining, is more considerably interested, through himself, his family, or in those of the telegraph or the cable.

Though I receive from all quarters the letters of indignant shareholders, I find it difficult here to get the signatures of one-fifth of the shareholders, scattered as they are over the United Kingdom; and this is required to force a general meeting on the reluctant board. New reasons for this reluctance on the part of the board continually present themselves to me. Clause C of the Flagstaff's Memorandum of Association uses these words in describing the objects of the company—"to sell the produce of any mines in a *rough* or *manufactured* state," and these are the only words under which, as far as I can see, the directors can profess to bring their sale in advance to Mr. Davis. But who will venture to persist that the sale of ore, yet undisturbed in the mine, can be brought under these words?

As no entreaties, no taunts will induce the directors to call a general meeting, it might not be amiss that a few shareholders should form themselves into a committee, and prepare a case on such documents as they possess, and such information as has been allowed to slip out, and take the opinion of competent counsel upon it. Should that opinion be in favour of filing a bill in Chancery, and add (as seems probable) that the principal part of the expenses would fall personally on the directors, who have produced a crisis that calls for the intervention of the shareholders, a bill might then be so drawn as to bring out the required information, and afford other advantages to the unfortunate shareholders.

Tunfield, Oct. 11. W. E. SURTEES.

THE TECOMA SILVER MINING COMPANY.

SIR,—Your various correspondents who have written about this mine have really put forward nothing to induce me to alter my opinion of the property. It is clear that not one of them has any basis or real foundation for stating that it will not eventually prove all that was indicated in the original report, and the generalities in which all the writers indulge apply equally to any other mine as to Tecoma. Not one tittle of real practical evidence has been adduced to show that the mines are even poor—not one writer has ever seen the mine, nor, judging by their correspondence, do they even know anyone who has. Whence, therefore, comes this heap of abuse—this wind talking? Strange it is those who hold shares in a mine seem the first to adopt—nay, in most cases, positively create—the means whereby confidence is destroyed in their own property; stranger still, that they are always the first to doubt the integrity of their own officials, and to place the most perfect reliance upon all outside rumours. It is this apparent inherent weakness that is the safety-valve of all concerted "Bear" operations. Experienced "Bears" know full well that oftentimes a single shrug of the shoulders is sufficient to induce holders to rush to sell. This intangible demonstration often does more in that direction than the most accredited reports and satisfactory results can produce in favour of an enterprise, especially if it be a mine. Tecoma shareholders! turn a deaf ear to your enemies' croakings, and await results. ANGLO-AMERICAN.

Oct. 15.

SOUTH AURORA CONSOLIDATED MINING COMPANY.

SIR,—I watch with interest the notices which appear from time to time in your City Article upon the position and prospects of this enterprise, but you do not appear to have pointed out one very material fact—that, financially, this company is incomparably better off than any other American mine upon the London market. There seems too much reason to fear that, probably with the exception of Richmond and Eberhardt, the whole of these mines are suffering from an impecuniosity which seriously militates against any satisfactory progress being made; but the South Aurora Company possess a mill, which has been and is likely to continue to earn of itself sufficient profits to enable the directors to pay good dividends, besides an absolute cash capital of something like 30,000*l.*, which, after the experience gained by some of our directors, can and no doubt will be so employed as to ensure the possession of a well-proved mine—equal, it may be, to others for which 300,000*l.*, or even 1,000,000*l.*, has been paid.

The remunerative results realised by our mill by the crushing of the Eberhardt ore is sufficient to show its capabilities, although it is not too much to say that the Eberhardt Company exacted unreasonable terms, and such that are not likely to be agreed upon in any new contract that Dr. Goodfellow may make with other parties; but, even under these conditions, it is evident a considerable profit has been realised, equal to a good dividend, and when a good mine shall have been secured this company will at once occupy a position certainly equal to Eberhardt, and (if proper care be exercised in the selection) even to Richmond Consolidated.

I have troubled you with these few lines in reply to the silly balderdash which I see appear occasionally in the column of some of your contemporaries, wherein is displayed so much palpable ignorance that it can have but one object—to induce those who bought shares at a premium to sell at a price less than represented by the available assets.—*Oct.* 14. A SHAREHOLDER.

MARBELLA IRON ORE COMPANY (LIMITED).

SIR,—Can any of your readers inform me how many vendor's shares there were originally in this company? For the purpose of determining whether I should sell my shares at the present price, 95s. (seeing they were at 70s. a short time ago), I had the register of members inspected on my behalf, and I am informed that the following names appear on the register as holders of fully-paid vendor's shares:—Messrs. G. Anderson, M.P., and James, C.E., 5000; the Credit Foncier of England (Limited), 1250; Messrs. Clavering and Scott (Glasgow), 1250. This makes 7500 vendor's shares, and I always understood there were only 5000. I also enquired of Messrs. Moffat and other stockbrokers, was that of Mr. Clavering, who was recently a director. This, I think, is a good feature, but as Mr. Clavering's name is mixed up with these extra vendor's shares it does not appear to me quite satisfactory. Is it possible that the recent rise in the price of the shares, after the disastrous revelations at the meeting, is only a ruse on the part of large holders to get rid of their shares at a better price, or is there really some gratifying news which is at present known to the shareholders? A HOLDER OF ONE HUNDRED SHARES.

Glasgow, Oct. 16.

[For remainder of Original Correspondence, see to-day's Journal.]

HYDRAULIC GOLD MINING—No. III.

BLUE TENT CONSOLIDATED.

In further reviewing the producing capabilities of this extensive enterprise it may be mentioned that its several claims embrace one of the largest areas possessed in one ownership on the Great Blue Lead. The gravels are proved to be uniformly profitable under the hydraulic system of washing, remarkably free from large boulder and pipe-clay, under entire control of water, which is now to be brought in at an elevation of 800 to 1000 feet above the bed-rock and so situated in regard to the delivery of the waste or debris that only very short bed-rock tunnels (two of which are now constructed and in use) are required to work off the entire superincumbent mass. The mines within its ownership are thoroughly opened for the use of large quantities of water, and have long proved highly productive. The duration of these mines, it is demonstrable, must be a full generation or two, while the amount of net profits annually available is limited only by the amount of water which, through the hydraulic process, can be brought to bear upon them, that this is capable, at moderate expense, of an almost indefinite extension. The actual results of working on a large scale, both here and elsewhere in California, show the net profits of this kind of mining to be over 75 per cent. of the gross product. The amount of personal or perishable property at stake in this kind of mining is too trifling to be considered, as it requires only the simplest and least expensive means. No mills, engines, pumps, hoisting-gear, or other costly and perishable machinery being required. The capital invested is speedily returned, and the remainder constitutes a vast fund, free from all risk of depreciation, waste, or fraud, the product being returned at regular stated periods in values which are the measures of all other values, and not like the results of manufacturing or commercial industry liable to destruction from the elements or total loss from changes in human plans or caprices.

By the laws of California, mines of all kinds upon the public domain are exempt from taxation, the improvements only being taxed. It follows as an unavoidable conclusion, from the facts before us, that there is no investment for capital where the principal is at once so safe and early returned, and the income so large and so steady for so long a course of years, as in such a consolidation of great permanent and productive interests as we have endeavoured to set forth in a clear light, but without any exaggeration.

While the area embraced in the Blue Tent Consolidated Hydraulic Mining Company's property is already among the largest owned by any single proprietorship in California, it is well to remember that there remains a larger extent (about six miles) of the same Blue Lead, reaching southwards, towards Quaker Hill, to which there is no outlet except through the Blue Tent property or the Quaker Hill property, and at a future day a large portion of this supplementary area is sure to fall with the ownership of the present organisation to their successors.

Professor Silliman, basing his estimate upon a careful survey of the property made by a United States surveyor, computes that there is $770,000 worth of gold obtained from the several claims were derived from washing down of 5,101,150 cubic yards of gravel, much the larger part of which was top gravel from 300 to 500 feet above bed-rock. The estimated value obtainable from such gravel placed at 10 c. per cubic yard. The general average by actual measurement gives 15 c. per cubic yard. Prof. Silliman adds that the measured volume given by this survey is about 1·25-100 per cent. of the total volume of gravel estimated as held in reserve in the Blue Tent property, while the net product of gold—$577,500—which the value washed has yielded, is very nearly equal to 2½ times the net unit value estimated as obtainable for a term of years, by the use of given volume of water. Hence we arrive at the data needful to enable us to calculate the probable time which the mass of gravel in the Blue Tent property will last, if worked at the rate specified. Thus:—5,101,150 cubic yards worked, divided by 2½, equals 2,185,286 cubic yards, the quantity for one year's dividends on the company's basis; therefore, 415,866,359 cubic yards of reserves, divided by the above quantity, for one year, will give 190 years as the length of time which these reserves will last, if the rate of consumption estimated is maintained. But it will be remembered that as the washings approach the bed-rock the gold product increases, and the rate of washing becomes slower, because the lower gravel is harder, so that the actual time required to wash off the whole mass of gravel will probably exceed by several years the period now calculated.

Mr. G. D. M'Lean (superintendent of the Sweetland Creek) states that the gold-bearing gravel attains a maximum thickness of 1000 ft. The 490 acres comprising the area, are almost entirely overlaid with alluvium, but in order to compensate for the exhausted pits, and any points where the survey may overlap the rim rock, we will lessen the area to 400 acres, as a basis of calculation, and the average depth to 225 feet. In 400 acres of gravel, 225 feet deep, there are 145,200,000 cubic yards, which including all of the richer under strata estimated at only 15 c. per cubic yard, the average obtained from the 5,158,150 cubic yards exhausted, give $21,780,000 gross as the returnable contents of the property. Suppose three monitors under a pressure of 300 feet, to discharge each 1000 in. of water, and to wash jointly 9000 cubic yards per day of 24 hours, and to operate continuously for 10 months; over 53 years would be required to exhaust the property, whereas if the additional depth of the placers was estimated at 10 c. per cubic yard, the amount returnable would be over $33,000,000, and 94 years or more would be required for the displacement. The expense usually attending hydraulic operations is from one-fourth to one-third of the gross returns—the water belonging to the mine.

Owing, however, to the difficulty of obtaining any reliable data for estimating the value of deposits by the cubic yard, a more satisfactory mode of computation of returns attainable in working auriferous gravels is found in the net profits of a given quantity of water used; 50 c. profit per inch, or $300 for each 1000 in., miners' measure, of water used for 24 hours may be safely calculated upon from average gravel washings. Upon this plan of calculation, for safety, shortening the water season to eight months, and limiting the supply to 3000 in., we have a net profit from this property (supposing the washing to be continuous) of $216,000 per annum.

It is generally conceded in California, where experience in both has been large, that gravel mining is far less precarious than vein, and that where the conditions of auriferous placer, water and adequate outlet are combined, there is hardly an instance of failure. These conditions, after the aqueduct shall have been completed, appertaining exceptionally to the Blue Tent Consolidation, and the proprietorship being amongst the largest in the State.

Mr. M'Lean knows of no property which better warrants a permanent investment, and promises larger and more lasting returns at a smaller current expense.

LONDON GENERAL OMNIBUS COMPANY.—Traffic receipts for the week ending Oct. 12, 9723*l.* 1s. 4d.

WISDOM OF MODERN TIMES.—It was all very well a century since for invalids to drag on from day to day in the hopes that Nature in time could readjust the system and restore the strength. At the present time, under different circumstances, inaction is unpardonable folly when Holloway's purifying and healing remedies can be found at every chemist's shop, and a cure of most complaints can be obtained, at a moderate outlay of time, trouble, and money. Let a sufferer under disease look at his position from which side he will, delay will surround him with increasing perils, from which a prompt use of Holloway's well-tested medicaments affords a ready and sure mode of escape, and safe conduct to soundness and health.

Meetings of Public Companies.

THE FULLER'S REEF GOLD MINING COMPANY.

The first general meeting of the shareholders was held at the company's offices, Lombard House, on Wednesday,—
Mr. W. HARDINGE TYLER in the chair.

Mr. JOHN BROOKE BOOTH (the secretary) read the notice convening the meeting.

The report of the directors stated this meeting had been convened in compliance with the provisions of the Companies Act, 1867, which requires the first meeting of the shareholders to be convened within four months after the registration of the company. The company was registered on June 16, and 4000 shares have been subscribed for, and out of the 40,000*l.* which will be received in respect of these shares the directors have arranged with the vendors to reserve to 20,000*l.*, which, according to the terms of the prospectus, are to be reserved for the purposes of the company. The solicitors are now investigating the title to the mines, and upon the being approved, and the property transferred, the purchase money and paid-up shares will be handed to the vendor. As soon as the property has been transferred (which the directors expect will be accomplished in a few days), the directors propose to telegraph to the committee in Sydney to commence working the mine, so that a dividend may be paid as early as possible. Since the prospectus was issued John Rodgett, Esq., of Preston, has, under the powers contained in the Articles of Association, been elected a director of the company. A telegram has been received by one of the directors, dated Sydney, Sept. 17: "Mine is looking well. Tunnel 900 feet. Gold showing freely." A letter written by one of the committee in Sydney to the trustee of the vendors has also been received by the last mail, from which the following is an extract—"As for the mine, it is (and you know I do not give my word rashly) looking wonderfully well; there is considerably over 100 tons at grass, all of which show free gold; the long tunnel is 900 feet; the mine is fully opened out, and with the expenditure of no very large amount of capital, a considerable amount of stone could at once be raised; there is no mine in the colony so perfectly developed, or with so much promise as this." The directors see no reason to doubt that the profitable results anticipated in the prospectus will be realised by the company.

The CHAIRMAN said the directors were sorry to be obliged to ask the shareholders to be present to-day, because they had very little to submit to them, but by the Companies Act they were compelled to call the first meeting within four months of the registration of the company. The directors were not able to communicate more than that which they had stated in their report, not having received any further telegrams from Australia. The documents with regard to the title were in the hands of the solicitors, who were investigating them, and they hoped in a short time to be able to state that everything was in order, when the purchase-money would be paid, and orders sent out to take possession. Business would be commenced with every energy, and he hoped that when the shareholders were next called together a report would be presented showing that considerable progress had been made, and satisfactory results realised. Every item of information received from the mine was most encouraging, leaving no reason to doubt that all the statements put forward in the prospectus would be borne out. The prospectus stated that the mine was in work, and the tunnel had been driven 700 ft.; since then it had been extended 200 ft. further, and the quartz taken had proved to be exceedingly good. The telegram stated that the quartz was "showing free gold;" that is, that gold was apparent in it, and he might add that some of the quartz which had been sampled here (where no gold was apparent) gave a result proving to produce to be very satisfactory. He did not wish to say how much, but it was very good. He then moved that the report be received and adopted.——Mr. BRODRICK seconded the proposition.

The CHAIRMAN, in reply to questions, stated that until the company took possession whatever quartz was taken out would have to be bought from the vendors, before it was most desirable that possession should be obtained as soon as possible.

No crushing had taken place since the arrangement for the sale had been made, but the quartz raised was obtained in the development of the mine. It was satisfactory they had secured 20,000*l.*, so that there would be plenty of funds to work the mine with; 4000 shares had been taken up.

The motion adopting the report was put, and carried unanimously.

A unanimous vote of thanks was passed to the Chairman and directors.

The CHAIRMAN having appropriately acknowledged the vote, expressed a hope that when they next met they would be in a position to adduce some substantial evidence that the property was fully equal to the representations made in the prospectus.—The meeting then separated.

ANGLO-ARGENTINE MINING COMPANY.

The adjourned special meeting of shareholders was held at Mr. Hillman's office, Cornhill,—Sir CECIL BEADON in the chair.

Mr. FLETCHER (the secretary) read the notice convening the meeting.

The CHAIRMAN having explained that Mr. Foster, the chairman of the company, was unable to attend from indisposition, stated that the first object of the directors had been to raise 10,000*l.* upon the unissued debenture capital, and had received most positive assurance that the money would be forthcoming, but they were disappointed. Really was a case of a most promising undertaking being wrecked for want of a little capital. The late reports from the mine were of a most favourable character, and there could be no doubt that had the necessary capital been subscribed the company's difficulties would have been tided over. But, under the circumstances, the directors had come to the resolution that it would be best for the interests of all concerned to wind up the present company, with the view, if possible, to reconstruct another company. He would, therefore, propose that the company be wound up voluntarily.——Mr. MARGETTS seconded the proposition, adding that there were many people who would not come forward to assist the present company, but would gladly co-operate if the company were re-constructed.

Mr. GREEN asked for information concerning the financial condition of the company, and also the character of the more recent advices from the mine.

Mr. FLETCHER (the secretary) replied that the liabilities in round numbers amounted to 7000*l.* He stated that during the last six months the working had been satisfactory, for in January they had been obliged to stop in consequence of the want of water, and the produce during the month amounted to 108 ozs.; in February a little over 354 ozs.; in March, 501 ozs.; April, 347 ozs.; May, 300 ozs.; July, 300 ozs.; June, 304 ozs. The agent had written to the effect that in August 36 heads of stamps would be at work, but they had not yet heard the result. Both Mr. Holman and Mr. Vivian had represented that when 36 heads were at work the monthly returns would be 1000 ozs., and if the ore realised 30s. per oz. all expenses would be covered, and a profit left.

Mr. ATTRILL stated that at the last annual meeting, upon the election of the board, the Chairman said that the directors had not taken one penny for fees for the whole of the year, nor would they do so until the shareholders were getting dividends. He now found that 1000*l.* was put down as owing to the directors.

After some further discussion the resolution was put and carried, Mr. W. R. Ingley dissenting.

Upon the proposition of Mr. MARGETTS, seconded by Mr. T. MILLER, it was resolved that the liquidators be authorised to sell the property of the company to any other company, upon such terms and at such price as shall seem best, and to receive as purchase-money paid-up shares, or partly so, as to the said liquidators may seem fit.

Mr. Dollman (solicitor) and Mr. Fletcher (the secretary) were appointed the liquidators, with a remuneration of 100 guineas each.

Mr. Green (a large shareholder) was also unanimously voted a liquidator, but declined the position so far as any remuneration was concerned, although consented to co-operate with Messrs. Dollman and Fletcher.

A unanimous vote of thanks to the Chairman terminated the proceedings.

BRADDA MINING COMPANY.

The half-yearly meeting of shareholders was held at the Royal Hotel, Douglas, on Monday,—
Mr. W. F. MOORE, H.K., in the chair.

Mr. P. BRIDSON (the secretary) read the notice convening the meeting, and the reports of Capt. Barkell and of Capt. Northey, who had been engaged to report upon the mine, were taken as read. The accounts to August 30 showed a balance of assets over liabilities of 452*l.* 1s. 7d. Capt. Barkell's report was remarkably encouraging, and he stated in conclusion that there was a decided improvement in their prospects compared with six months ago. This was due to the improved character of the lode in the two principal points—the 70 north and south. Capt. R. Northey would drive the 27 fm. level north and south, so as to expedite the proving of a fine piece of mineral ground, and if possible would also drive the 70 fm. level south at the same time.

The CHAIRMAN, in moving the reception and adoption of the reports, remarked that Capt. Northey recommends driving the 27 fm. level north and south from both ends, forking the water only to a little below that depth. If this plan be adopted the work must cease in all levels under the 27; consequently the ground that was so productive in the 40 fm. level north could not be worked at the 60 and 70 to get under it. If the engine at Spittall's shaft is to be kept going, and it must be if the 27 is to be driven from both ends, surely the sinking of this shaft should go on simultaneously to the 70; and, further, it must be remembered that the 27 is too shallow to prove the mine, but the 70 would, and taking the dip of the ore into consideration, practically you are nearer developing the ground at Spittall's shaft at the 70 than at the 27, but as there is no money to drive both ends, why not drive the 70 north and south? If the ore which was found in the higher levels should be found in increased quantities in the 70 north, then sink the north shaft; and should a discovery be made in the 70 south, then sink Spittall's shaft out of the proceeds of the ore found, or get fresh capital into the concern, if deemed more expedient. If a valuable discovery should be made in this direction (which there is reasonable grounds for expecting), no doubt the shareholders would take courage, and others too would be induced to infuse fresh blood into a concern which all mining men say cannot ultimately fail. He explained that the directors were carrying out the recommendations of the several mining men who had inspected the property as far as their financial position would admit. They were not sinking Spittall's shaft, as recommended by Capt. Rickard, simply because they had not funds to do it. The 27 fm. level, which was moreover too shallow to prove the mine, could not be driven from both ends, as recommended by Captain Northey, without working the engine at Spittall's shaft, and they had no money to work it, especially considering the present high price of fuel, which is a very important point. The directors had only one course to pursue—to develope the mine to the best of their ability, which they would do for their own sakes, as they were all largely interested as shareholders. No doubt was entertained as to the ultimate value of the mine, and they had the opinions in support of this view of competent authorities, including Capt. Rowe. Capt. Wm. Kitto held the same strong opinion with regard to its future wealth. Capt. Rickard in his report mentioned three modes of developing the mine; he would simply refer to the last mode which he proposed.

Mr. L. G. HOWARD believed that was the plan they had adopted.

The CHAIRMAN said it was, but they had not funds to carry it out in its entirety. He recommended the sinking of Spittall's shaft to the 70, and then to drive from it to the north shaft. He estimated the cost at 7500*l.*, and their capital then—in 1871—amounted to 11,000*l.* Not one-third of the work had been done, yet over 6000*l.* had been expended, so that they might conclude that the remaining two-thirds would cost 12,000*l.* more; the directors were agreed, however, that Captain Rickard's was a splendid mode of working the mine if they had money to do it. Capt. W. Kitto was of opinion that Bradda is a great champion lode, and it can only become a great mine in depth; they would, therefore, continue the driving of the 70.——Mr. P. KILLEY seconded the motion.

Captain BARKELL said there had been no particular change since he wrote his report. There was, however, an improvement in the 70 south; the cross-course had been passed through in the end about 2 ft. They could not yet tell whether it was the main one, or merely a branch of it. Since they had passed this cross-course the ground looked somewhat better, and it was composed of friable spar, with an admixture of copper and lead ores.

The CHAIRMAN understood Capt. Barkell to approve of driving the 70 fm. level, and not driving the 27 fm. level.

Captain BARKELL said, decidedly. He candidly gave it as his opinion that the driving of the 70 would accomplish exactly what the driving of the two would do. Stones of blende had been found in the 70 north, which was a very good feature, and they had not often been seen recently; he considered this a very important point. They expected a valuable change when they got under the hand-pump sump.

The report and accounts were then unanimously adopted, and upon the proposition of Mr. L. G. HOWARD, seconded by Mr. KILLEY, the retiring directors—Messrs. Spittall and W. F. Moore—were re-elected; and Mr. James Haining was re-appointed auditor.

The proceedings terminated with the usual complimentary vote of thanks.

GREAT EAST FOXDALE SILVER-LEAD MINING COMPANY.

The half-yearly general meeting of shareholders was held at the office of the company, Seel-street, Liverpool, on Saturday,
Mr. JOHN WALKER in the chair.

The SECRETARY read the directors' report, as follows:—

It affords great pleasure to the directors in meeting the shareholders at the close of another half-year to be enabled to make a very favourable report of the progress of the mine. The balance-sheet, a copy of which was duly forwarded to each shareholder, shows a large balance available towards the future development of the mine, comprising cash at the bank and in hand, 271*l.* 8s. 3d.; subscribed capital at call of 10,588*l.* 18s.; and machinery and plant on the mine value 1511*l.* 11s. 9d., after deducting at the rate of 10 per cent. per annum for depreciation.

The directors beg to say that every effort has been brought to bear in order to push on the development of this very valuable mining property. They had hoped by this time to have had the main shaft considerably deeper than it is, but the ground has continued so hard a nature that progress has necessarily been much retarded; however, since the last general meeting, held on the 5th April, a very fair development of the mine has been accomplished. As the shareholders will perceive from the reports of Capts. Bawden and Henry Lobb, the 40 fm. level east has been extended 27 fms., and a stope of 25 fms. worked above the 40, which has produced ore of a very rich quality. Likewise, the shaft has been completed to the new or 53 fm. level, a lodge cut out, and a cross-cut made to reach the lode, which the directors are happy to state is equally as rich as the lode cut in the 40 fathom level. They are glad to report that the amount of lead stuff at present at surface ready for dressing is about 150 tons, calculated to produce from 30 to 40 tons of marketable ore; but the directors do not consider it advisable for the present to erect dressing floors, as they think it better to wait until the mine is more fully opened out, when the best and most convenient place will be selected for the erection of dressing floors. The directors have contracted for the sinking of the engine-shaft another 15 fms., which work shall be pushed on with all speed. A cross-cut will then be made to reach the lode 68 fms. deep, which no doubt will be found richer than in the 53 fm. level, as the ground improves in depth. When this piece of work is completed, and the 68 fathom level driven east and west, there will be splendid ground opened out for stoping. In the meantime, the directors will suspend the stope between the 40 and 30 fm. levels, and confine the working to the sinking of the engine-shaft, and the driving of the 40 and 53 fm. levels east, and bring to surface only the lead ores taken out of the driving. The directors are particularly anxious to avoid exaggerated statements in their report, and gave instructions to that effect to their agent at the mine; they also called in Capt. Bawden to give an independent report, and make new plans of the workings, and which report and plans are now placed before the shareholders.

In conclusion, the directors beg to state that the mine looks better now than at any previous time, and their confidence in its success is borne out by the reports, which show that the 53 fm. level is richer than the 40, and that there is every reason to expect that the 68 will open out still richer. By the time of the next general meeting the directors boast that in-stead of 150 tons of orestuff being at surface they will be prepared with three times that quantity with which to commence operations on the new dressing-floors. The machinery, pitwork, &c., are in the most efficient working order, and every requisite is provided for the effectual and economical working of the mine.

The report received from Capt. Bawden was read, as follows:—

In again presenting you with my report for the general meeting, to be held on Oct. 11, I am glad to say the prospects held out in my last have been fully realised. Since then the engine shaft has been completed to the 53, a lodge cut, and a cross-cut extended to the lode. In the intersection there was a nice rib of solid ore on the hanging wall, but on driving about 2 fathoms to the west it was found to be wrought away by the old workers, showing this to be a productive part of the mine. This level is driven east 7 fathoms, and is just now turning off upon the north part of the lode, which is at present very kindly, and producing good stones of ore, though not as yet in paying quantities. By driving this end about 10 fathoms further you will come under the ore ground in the level above, and should it be found productive at this point you will have a valuable section of ore ground for stoping, the lode between both levels being entire. You could also from this level cross-cut the lode to the south part of the lode, and by so doing you would test its value, and avoid the expense of driving a level. The 40 has been driven east upon the south part of the lode some 24 fathoms, and passed through a good course of ore, highly remunerative. The forebreast at present is not so good. An interesting feature in connection with this level is the intersection of the caunter vein seen in the 30, which can now be only a very few fathoms ahead. A tramroad and wagon should be at once provided for this level, in order to facilitate the getting clear of the stuff, the distance to wheel being too great. A sump has been commenced in this level to prove the continuance or otherwise of the course of ore gone through, but I should prefer seeing its position altered a little. A pitch is also being wrought in the roofs of this level, and still shows the ore to hold good going up; the working of this I would advise for the present to discontinue, as I can see no benefit accruing, rather otherwise, by stoping the ground away until your dressing-floors are ready. Every effort should be made to get the engine-shaft down for another level as quickly as possible. The appearance of the lode in the 53 being highly favourable, and the vein at this depth inclining a great deal more to the perpendicular, makes your cross-cuts much shorter, and less expensive. The sooner you get down below the old workings and into new ground the sooner, in my opinion, you will have a lasting and profitable mine; in fact, everything seems to warrant such being the case.

The report from the agent of the mine was read, as follows:—

Sept. 22.—I beg to hand you my report and summary of the work done at the above mines since the last general meeting, held on April 5 last. The 40 fm. south-east level has been driven 27 fms., passing through some good ore ground; the end at present is not yielding much ore, but it is looking exceedingly promising and kindly, and I am daily expecting an improvement, as the end is becoming very wet, and the lode is strongly mixed with blende, &c. A stope, 10 fms. long, has been commenced in this south-east level, and about 25 fms. of this ore ground has been stoped away: this piece of ground is now producing first-class dressing stuff. A sump has been cut out ready for sinking, as it was necessary that a sump, or winze, should be sunk in this level near the end of the present stope (in which there is a nice course of ore) to go down and meet the drivage in the 53 fm. level, so as to obtain ventilation throughout the mine. We shall, moreover, be raising ore out of this sinking, as well as prove the ore ground. The west end in the 40 fm. level has been driven 3 fms., and looks promising, but is as yet unproductive. In the 53 fm. level a new lodge has been cut out, and a cross-cut driven 3½ fms. to reach the lode. We have also driven 3 fms. on the west and 5 fms. 1 yard on the east part of the lode, out of which we have raised some splendid ore, as seen on surface. There is a full staff of men pushing on the several points, and laying open and working the ore ground as quickly and economically as it can possibly be done. The shaftsmen have to-day commenced sinking the engine-shaft below the 53 for another 15 fm. level, with a full staff—12 men, and I expect this piece of work will be completed in about six months, and when the lode is cross-cut into I have no doubt whatever that it will open out more productive still, as mines in this island become very rich in depth.—H. LOBB.

The CHAIRMAN said he considered the reports which had just been read were exceedingly gratifying, and he had no doubt the shareholders would also be of the same opinion. Since the last general meeting there had been a large amount of work done in opening up the mine, which was at the present time in a very advanced stage of development. He had great pleasure in referring to the satisfactory manner in which the affairs of the company were looked after by their energetic managing director, Mr. T. Hughes, and he (the Chairman) felt sure that success would very soon reward the efforts of the directors in general to bring the mine into a dividend-paying state. He would now beg to move that the directors' report and the accounts be received and adopted.

Mr. WHARRIE asked for explanations of the amount—7209*l.* 14s. 9d.—appearing in the balance-sheet as cost of mine and outlay thereon, and after a full explanation by the auditor, Mr. J. S. Blease, Mr. Wharrie expressed himself perfectly satisfied.

It was then resolved that a copy of the particulars of this item be printed and sent to each shareholders.

The MANAGING DIRECTOR then explained to the satisfaction of the meeting the various items of expenditure.

The proposition, as moved by the CHAIRMAN, that the report and accounts be passed was seconded by Mr. BERTENSHAW, and carried unanimously.

The MANAGING DIRECTOR then gave an explanation of the different points of working in the mine, and spoke of the increased confidence he felt in the great value of their property since his last visit to the mine, a few weeks back. He assured the meeting that no time should be lost in carrying forward the work recommended by Capt. Bawden, especially the further sinking of the main shaft, so as to enable them to drive a level to reach the lode at a depth of 68 fms. from surface. When this was done the directors would then be in a position to fix upon the best place for the erecting of dressing-floors. He had every hope they would then be able to dress enough ore to pay for working expenses, and leave a handsome profit besides.

Mr. BARKER then proposed the re-election of the retiring director, Mr. William Morton.——Mr. T. HUGHES proposed the election of Mr. D. P. Rule, as director.

The propositions were seconded by Mr. LESLIE and carried unanimously.

On the proposition of Mr. LESLIE a vote of thanks was given to the directors for the able manner in which they had conducted the affairs of the company.

A vote of thanks to the Chairman terminated the proceedings.

THE CROWN MINING COMPANY.

A general meeting of shareholders was held at the company's offices, Austinfriars, on Tuesday,
Mr. GEORGE LAVINGTON in the chair.

The notice convening the meeting having been read,

The CHAIRMAN stated that this being the usual statutory meeting the directors had no report or statement of accounts to lay before the shareholders. The proceedings are purely of a formal nature. There was a full report from the manager, which would be read, and would afford great satisfaction from its encouraging character.

Pentervgd, Oct. 11.—This mine adjoins the western boundary of the West Esgair Lle Mine, the main lode of the latter running through the sett, which is very extensive, being at least two miles east and west on the course of the lode, and about ¾ of a mile from north to south. The workings of late have been chiefly confined to driving an adit level parallel with the main lode of West Esgair Lle; this lode has been traced on the back by costean pits from the former mine to the present working in this, showing at every place where it has been opened on great deposits of gossan, and varying in size from 50 to 60 ft. wide; this is identical in every respect with the back of the lode seen in West Esgair Lle, which mine now speaks for itself, having a course of ore only 24 fms. under adit valued at 60*l.* per fathom. During the past week the lode has been intersected in the adit level, and as far as they have gone into it it is of precisely the same character as when we first intersected the lode in West Esgair Lle, and, from present appearances, I should not be at all surprised at any moment to hear of their striking into a good course of lead ore; the lode, as before mentioned, being from 50 to 60 ft. wide, it will take them at least two months before they reach the south wall; when this is done an engine-shaft from surface should be at once commenced, and sunk (say) 20 fathoms before tapping the lode, the result of which, I can safely say, would be most satisfactory; in fact, when we take into consideration the present highly satisfactory appearances of the lode, and the material improvement that depth has attained in the development of this lode at West Esgair Lle, I can come to but one conclusion, which is that in prosecuting this lode success is a certainty. There are, traversing this sett, numerous other lodes, one of which I should strongly recommend being opened on; this lode is parallel with the main lode, from which good stones of lead ore have already been broken by costeaning. An adit level might be driven to cut this lode about 10 fms. deep. The local advantages of this property are excellent, inasmuch as a plentiful supply of water can be obtained for working all requisite machinery at all seasons of the year; this is a very important matter for such an extensive mineral grant. The mine is also in close proximity to the leading mines in Cardiganshire, including the Lisburne Mines, Great West Van, Cwmystwith, West Esgair Lle, &c. There is a good turnpike-road running through the sett for the transit of ore and materials to and from the shipping port of Aberystwith; in fact, you have every facility for carrying on this property on a very extensive scale. In conclusion, I may state that for the whole of my 12 years' experience in this county it has never been my lot to examine a property that promised greater success than this, and I beg to congratulate the shareholders on being in possession of such a mineral grant.—R. HARVEY.

The CHAIRMAN, in answer to a question from Mr. Pennington, said the working capital was, no doubt, large—20,000*l.*—but that was a point upon which he thought the prudence of the original promoters of the company was to be commended. It should be borne in mind that this property was extensive, there being sufficient ground for two or three mines of ordinary dimensions on the great champion lode alone. There were several other lodes in the property, one of which was being successfully wrought at the Great West Van Mine. He (the Chairman), the last time he walked over the mine, saw in a pit at surface some good branches of lead in this lode. No doubt the company would feel it incumbent on them before long to lay open these promising lodes, and it was satisfactory to know that the working capital was ample for this purpose. Therefore, although large, it cannot be said to be excessive, considering the area of the company's property, and the many points which can be operated on to advantage.

Mr. W. B. HARVEY stated that as a resident in Wales, and one who had had many years experience of Welsh mining, he could testify to the brilliant prospects of the Crown. His experience extended over 40 years, and he could safely say that he had never seen a finer lode, nor a more congenial (for mineral) stratum of country that existed in this mine. (Hear, hear.) He had also had many conversations with old miners in the district, and their opinions were unanimous that it was a most valuable property, only requiring the necessary time to develope into a dividend state, and to take its stand in the front rank of Welsh lead mines.

A SHAREHOLDER enquired when the directors proposed to commence opening up the side lode?——The CHAIRMAN stated it was not, in the opinion of the directors, advisable to begin this work during the winter months. It would be time enough next spring to consider this question.

There being no business to transact, after some further discussion, a vote of thanks to the Chairman terminated the proceedings.

INDUSTRIAL PARTNERSHIP COLLIERY COMPANY.

The statutory meeting of shareholders was held at the offices, on Thursday, Mr. J. WELLS OWEN in the chair.

The SECRETARY read the notice convening the meeting.

The CHAIRMAN said that but one colliery had as yet been purchased—the Mwyndissco; only one shaft had been sunk by the former proprietors, but in compliance with the Government regulations another was in course of sinking, and would thoroughly open the property. In the meantime, in order to carry out one of the objects stated in the prospectus, arrangements had been made with other colliery companies to supply the shareholders at dealers' prices.

Mr. NICHOLSON stated that he had lately visited the colliery, and was very much pleased with all he had seen. He fully anticipated that a large dividend would be paid by June next. They expected to reach the Holly seam, and if they did so the value of the property would be increased by at least 10,000*l.*

Colonel WIGGINDON corroborated all that had been stated, and expected the company would pay 20 per cent. by June next.

After some enquiries had been satisfactorily replied to, a unanimous vote of thanks was passed to the Chairman and directors, and the proceedings then closed.

SOUTH CARN BREA MINING COMPANY.

At a general meeting of shareholders, held at the mine on Tuesday, the purser (Mr. Walter Pike) presiding, the accounts showed were:—Labour costs for three months' ending August 29, 1150*l.*; merchants' bills, &c., 739*l.*; total costs, 1889*l.* Copper ores sold about 134 tons, less 1-18th dues, 819*l.*; black tin sold about 14 tons, less 1-18th dues, 932*l.*; extra carriage of tin, about 2*l.*; total credits, 1753; showing a loss on the three months of 136*l.*, and a total balance against the adventurers of 442*l.* It was, however, considered unnecessary to make a call as the prospects of the mine are good. The meeting was then made special, according to notice, and it was resolved that all shares upon which the last call had not been paid should be declared forfeited, and that a special meeting should be held on Nov. 3 to confirm this resolution. Should the call be paid on any shares prior to the special meeting they will be restored. The following report was read to the meeting:—

Oct. 13.—The engine-shaft is sunk 8 fms. under the 150; the lode in the bottom is about 4 feet wide, yielding excellent stones of copper ore, and looks very promising to improve. The 150 east is extended 70 fathoms; the lode in the end is 4½ feet, composed of quartz, and yields rich stones of grey copper; this end seems to be very near the rich course of ore seen in the 130. The ore is evidently dipping east in depth, hence the reason we have not intersected the profitable ore ground in the 150 ere now; we, however, feel confident we shall soon have a good paying lode in this level. The stope in the 150 is worth 50*l.* per fathom; the lode in the 140 west looks more promising than of late, and carries a little tin; the ground also is easier for driving. We have a very large extent of unexplored ground going west, which this level will prove. Two stopes in the back of the 130 east are worth 10*l.* to 15*l.* The stopes in the bottom of the 130 are worth 50*l.* per fathom. As already stated, we are daily expecting to cut the course of ore in the 150.—W. RICH, J. KNOTWELL.

WICKLOW COPPER MINE COMPANY.

The half-yearly meeting of shareholders was held in Dublin yesterday, when the following report from the directors was presented:

The sudden depression in the alkali trade, and the great advance in the price of all the raw material necessary for the manufacture of salt cake and bleaching powder, told most severely, during the last six months, against your chemical works at Arklow; the more so as the works for the economising of some of the most expensive materials used in the manufacture of these articles, and for which the additional capital had been for the most part raised, were not at the beginning of this half-year even commenced. Under these circumstances, it became a matter of the utmost importance with the present board of directors to determine whether, with the prospects of the chemical trade, they should spend any more capital in adding to the present works. After a most careful consideration of the position of affairs, your directors were reluctantly compelled to come to the conclusion that the works not only had been but were being carried on at a considerable loss, and they, therefore, determined, not seeing any likelihood of matters improving, to close the works and stop all expenditure upon them. This, however, it was not possible to do until June, as some few contracts had to be completed, and some structures already commenced had to be finished.

Your directors now deem it their duty to report to the shareholders that, in their opinion, it is not prudent for your company to continue the manufacture of chemicals: that it will be more consistent with your objects, and every way more for your interests, that you should throw all your energy into the proper working and due developing of your iron, sulphur, and copper mines, and that you should resolutely, and at once, look in the face whatever loss has been already sustained.

It is not for the present directors to refer to the past, nor need they remind the shareholders what an expenditure of capital has taken place at Arklow, or of the losses incurred, but it is their duty to explain to the shareholders that they believe the best course to adopt now is to dispose of the stock of raw and manufactured materials on hand, which they believe can be done without much sacrifice from cost price, and to sell the present chemical works, which are in excellent order, at a fair valuation.

The report of your manager, Mr. Hodge, will be read with satisfaction in connection with the mine account for the past half-year, as showing a profit on the working for that period of 3154*l.* 1s. 7d. It must be forgotten that a great deal of the iron ore delivered during the period was on account of an old contract, now almost finished, at 8s. a ton, being much below the present price for your ore, for which the demand is brisk. The discovery of fresh iron lodes, alluded to in Mr. Hodge's report, will, during this half-year, be fully tested as to its extent; but the existing, and now uncovered, lodes will enable the present demand to be completely

met for some years to come, and the Dublin, Wicklow, and Wexford Railway Company have arranged to carry more than twice the usual quantity of iron ore to Arklow. As the profit on the iron at present prices is somewhat larger than that on the sulphur ore, the present deliveries of iron will more than make up for any falling off in the delivery of pyrites.

The directors would, however, call your attention to the much increased raisings of copper pyrites, for which there is a ready sale. When the new operations are completed in the Time House shaft, the raisings of this quality of ore will be greatly increased. These operations may be expected to be completed in eight or nine months. A sum of about 500*l.* was, during this half-year, spent on new exploratory work. This amount has been paid out of the profit of the mine for the half-year; had this amount been charged—as it fairly might—to capital account the profits on the working of the mine would have been so much larger. Passing to the statement of accounts, it will be seen that the directors have placed the premiums received on the new shares issued on February last to the credit of profit and loss. This may be, perhaps, the place to mention that in the management of the mine and Dublin office a saving of about 500*l.* a year has been effected. Mr. Baker has been elected secretary in Mr. Kildahl's place, and Mr. Entwissle as book-keeper and transfer clerk in Mr. Pike's and Mr. Chamney's places. Mr. Hughes, who was elected auditor by the shareholders in November, 1871, was elected director in the room of Mr. Fennell, who resigned. The vacancy thus created in your auditorship must be filled up at the present meeting. The directors who in rotation retire are Dr. E. Perceval Wright and Mr. Brindley Hone, who, being eligible, offer themselves for re-election.

[We shall give a report of the proceedings in next weeks' Journal]

CHESTERFIELD AND DERBYSHIRE MINING ENGINEERS.

The quarterly meeting of members was held at Chesterfield on Thursday. In consequence of the absence of the authors, the discussion of the papers "On Coal, its Nature and Uses," by the Rev. Mr. Mells, and "On Economy of Fuel for Colliery Consumption," by Mr. S. C. Wardell, was postponed.

Mr. Howe's paper "On Experiments in Coal Washing at the Clay Cross Collieries" was then commented upon, and the author in supplementing his paper remarked that the system of washing had greatly improved the coke at Clay Cross. It bound it together, and saved much labour in taking away smudge; the percentage of washed slack coal had also been increased of late. Some specimens of the coal, coke, and refuse resulting from the process were shown; and Mr. W. Howe said that they used coal dust for moulding purposes, and the slack, when ground up, made good material for casting operations.

Mr. Wm. Weston read a communication on "The Winning and Working of High Park Colliery," in which he described the position, extent, and other particulars of the High Park Colliery, which is situate near the High Park Wood, Nottinghamshire; how, during the sinking of the shafts, they had to contend with the infiltration of water through the stone strata from a neighbouring canal reservoir, which held a large quantity, which difficulty they overcame by means of cast-iron tubbing; how they encountered innumerable other obstacles in progress of sinking; and how they were at length all overcome and coal reached. Mr. Weston remarked that they had brought an action against the railway company which owned the canal that had done so much damage, and caused so much expense, and obtained a verdict for damages to the extent of 5000*l.* He next described the system of working the colliery, showing the thickness of the seams, their quality, the extent so far worked, the method of haulage adopted, the system of underground roads, together with the comparative cost and advantages of making new cross roads at regular distances, or carrying the gate roads a few hundred yards further, besides dealing with the subject of ventilation, output, &c. In concluding his remarks, Mr. Weston had said the time had come when coal-cutting machinery must be used in this district, where the coal is so hard, in order to enable them to compete with other districts where coal is so much more easily worked. He would earnestly impress upon the Institute the importance of perfecting one of the many coal-cutting machines, so as to render it capable of being brought into general use.

Mr. R. F. Martin, M.A., next read a paper "On Coal-Cutting Machinery," which was supplemented by sundry remarks "On Air-Compressing Machinery." The writer sketched the numerous improvements which had been made in the method of working coal mines, and the many operations which had been altered or modified by the application of machinery. The three great operations to which machinery yet remained to be applied were banking, holing coal, and underground haulage. The Midland district seemed to him to be peculiarly well adapted for the universal adaptation of coal-cutting machinery, as it was the only district in which the "long wall" system was generally carried out. They were, too, short of men in the district, so that none could be thrown out of employ by the adoption of these machines. Of a certainty coal-cutting machinery would sooner or later have to be adopted. He had himself inspected three different machines whilst they were at work—W. Baird and Co.'s, Winstanley and Barker's, and Gillott and Copley's (Barnsley). In noticing these machines in detail he would endeavour to show their points of excellence and their respective drawbacks. Baird's (the Gartsherrie) was worked by compressed air. He thought it a compact machine, and it ran on broad wheels, but it would only work at one speed. The teeth were fixed on an endless chain, the shape and manner in which they were adjusted giving them a sort of scraping rather than a digging action. The machine of this kind which he had seen at work was operating very hard coal, yet it would win about 40 ft. per hour, or nearly 120 yards during a night, requiring two men and a boy to work it.

The next, Winstenley and Barker's machine, was driven by compressed air on, in his opinion, a superior method, at 20 to 30 lbs. per inch pressure, ran on a broad gauge, was of simple construction, started its own holing, had claw-shaped teeth fixed to a wheel, worked an average 30 yards per hour, and appeared that the quicker it was worked the better. The third, Gillott and Copley's machine, was driven by compressed air at 20 to 30 lbs. pressure, was self-propelling, would suit the gauge of any colliery tramway, was compact and light, had also twenty steel teeth fixed to wheel periphery in alternate double and single teeth, gave 120 strokes a minute, and cut about 30 yards per hour. He then alluded to an improvement of Winstanley's machine; Hird's machine, which he believed resembled Baird's; and Firth's, which imitated the manual operation. In his opinion the law of invention seemed to provide that the first machines invented imitated the manual operations, which they were intended to supersede, and that subsequent machines for the same purposes were greatly modified, and made on simpler principles, the law being very applicable to the inventions having for their object the successful cutting of coal by machinery. Mr. Martin then detailed what he believed to be the respective good and bad points of the several coal-cutters. Baird's was strong and solid, and the principle of an endless chain was a good one, but the scraping action of the teeth was, he thought, against its success, and caused it to compare unfavourably with others as to speed. Winstanley's, whilst showing a thorough adaptation of the various parts, was spoiled by having the cutter and cutting frame too heavy. Gillott and Copley's had many good qualities, but he deemed it too lightly constructed. The model machine he opined ought to have a frame of steel of the very simplest pattern and best workmanship, and should run on a regular gauge. Of the saw and chain cutters he should prefer the saw. The machines would cut out 30 yards per hour, tended by two men and one boy, and would result in a saving of 25 per cent. Mr. Martin, in concluding his paper, made some appropriate remarks on machinery for compressing atmospheric air.

Discussion being invited by the Chairman, Mr. W. Howe said that the angle of the teeth of Baird's machine was probably arranged to prevent the slipping of the chain. He had seen one of Firth's cutting machines, and it seemed to work very well. He had also seen the Gillott and Copley machine at work, and at a future time would bring his notes stating what work he had seen it do.

Mr. R. G. Coke said the chief objections to most coal-cutting machines were their very great weight, their intricate construction, and their expense. These objections applied to every machine described by Mr. Martin. He, personally, thought Firth's machine was the best. It imitated the blow of the miner, was neither very expensive or complicated, and might easily be moved in case of accident. If a hard substance were encountered Firth's machine could be stopped almost instantly, whilst others went on "grinding away," and were thus rendered liable to injury.

Mr. Martin thought that one desideratum in a coal-cutting machine was that the feed ought to slip.

Mr. G. H. Wright (Butterley Ironworks) had seen a coal-cutter which was propelled by a screw which was worked by hand, and the man in charge could, therefore, thus regulate the stroke according to the hardness of the substance in process of being cut. The Chairman remarked that the new collieries now being opened out could not be worked except by the introduction of machinery. That was the only way in which people could be supplied with more coal, and at a low price. There were plenty of machines, some of them good ones, but the great question was the motive-power.

NORTH STAFFORDSHIRE INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

At a meeting of members held at Stoke-upon-Trent, there were present Mr. T. S. Wilkinson, president; Mr. C. J. Homer, vice-president; Mr. J. R. Haines, hon. sec.; Messrs. R. Clive, J. Warner, J. Strick, R. J. Strick, C. May, jun., F. S. Bishop, T. M. Goddard, P. Gaskell, G. Gaskell, J. Ashworth, O. Lucas, J. Coe, W. S. Coe, C. Lawton, B. Woodworth, R. Beswick, jun., G. Hunter, T. E. Storey, J. Brown, J. C. Cadman, E. Jones, R. Jones, W. Fenton, S. Eardley, &c. Mr. G. H. Bond, mining engineer, Nottingham; Mr. John Derbyshire, mechanical engineer, Kidsgrove; Mr. J. Coe, mining engineer, Norton-in-the-Moors; and Mr. G. C. Greenwell, mining engineer, Poynton, near Stockport, having been previously nominated, were elected members of the institute. The following were nominated for election as members at the next meeting:—Mr. M. Adkinson, colliery manager, Longton; Mr. J. W. Higginbottom, coalmaster, Longton; Mr. Martin Forrester, coalmaster, Weston Coyney; Mr. R. A. Marshall, mining engineer, Riddings, near Alfreton; Mr. T. Sanderson and Mr. George Willis, underviewers. Crewe Coal and Iron Works.—A correspondence was read in reference to the publication of Dr. Hill's lectures, which were delivered before the institute in the spring, and on the motion of Mr. Homer, seconded by Mr. J. Strick, it was decided, after some conversation, that those lectures should be published at the end of the year in connection with the president's address and the other proceedings of the year. It was decided to postpone the excursion to Cannock till the spring.

Mr. Haines, the secretary, showed a model of a "Permanent Travelling Fence," which has been invented by Mr. Wm. Blakemore, of Wolverhampton, with a view of preventing persons accidentally falling down pit shafts. To the runner which covers the pit top when the tub or cage rests upon it is attached the fence, and as the runner is removed, to admit of the lowering and winding up of the tub, the fence is easily slided round the shaft, and effectually protects those engaged on the pit bank from accidentally falling down the shaft. Mr. Homer said it appeared to be a very good arrangement, and was very simple, which it ought to be, for any complicated arrangements ought to be avoided. A vote of thanks was unanimously accorded to Mr. Blakemore for having kindly sent the model to be shown to the members.

Mr. J. Ashworth, of Bank Top Colliery, Burslem, then introduced and explained the principle of a rock and coal perforator (Macdermott's patent) which is adapted for colliery, mine, tunnel, and quarry work. It consists of two metal bars set in the form of a St. Andrew's Cross, and jointed at their intersection; the upper extremities of the cross being connected by means of a screw and nut set in a tube, and the lower ends roughened at the edges and steel pointed. There is also a third hanging leg of variable length, to take the back thrust of the screw. The tube at the top of the standard carries the box and boring mechanism, but set horizontally, and it is also provided with an arrangement for turning the nut on the screw. The mode of operating is so simple as not to require skilled labour, and one man can with the perforator do the work of three or four men boring in the usual way. It will bore a hole equally well in any direction, and the holes by it are straight and clean. Mr. Homer said he had sent two bailiffs to see one of the perforators work, and he had determined to order some to be used in his pits at once. He thought that anything which they could introduce which would save labour would be a step in the right direction. Hand labour was so difficult to obtain, that if they could get anything in the shape of mechanism to do the work of coal getting it would be better for all. Mr. Clive proposed a vote of thanks to Mr. Ashworth for having introduced and explained the mode of working the perforator, which was seconded by Mr. T. M. Goddard, and carried unanimously. Mr. Homer intimated his intention to read a paper as soon as he could find time to prepare one, and suggested that other members should endeavour to prepare papers which might lead to discussions advantageous to them all.

OUR COAL SUPPLY, AND INDUSTRIAL ENTERPRISE.

The positive necessity of cheap coal for securing the prosperity of our chief national industries is generally appreciated, and for that reason, if for no other, every undertaking brought forward for the purpose of increasing the supply of fuel should have the support of every capitalist desirous of benefiting the country. It has been estimated by no less an authority than Mr. Isaac Lowthian Bell, the President of the Iron and Steel Institute, that an addition of only 5 per cent. to the present output of coal would restore prices to their normal condition, so that there is no reason to suppose that those branches of enterprise prejudiced by the present abnormal prices will be so seriously affected as to bring about a reaction resulting in a falling off in the demand for coal and the consequent decline in the price to such an extent as shall make its production unprofitable to the colliery proprietors. In this connection the lecture of Prof. Leoni Levi, recently delivered at King's College, "On the Influence of the Price of Coal on the Productive Industry of the United Kingdom" possesses peculiar interest, since it shows that the difference in price has been secured chiefly by the coal-owners, and that at least for some centuries we need not fear the exhaustion of our mineral fuel and the consequent extinction of our commerce. He observed that we had a supply for nearly four centuries, even allowing for about the present rate of increase, our available stock being not less than 90,000,000,000 of tons, and that by extending our operations to a greater depth we can readily increase this by 50,000,000,000 more, so that it will readily be understood it will long be the question of supply and demand alone, apart from question of coal within reach, which will regulate price.

That the coalowners were scarcely receiving a fair remuneration for their outlay and responsibility in 1871, when the margin between the cost of producing the coal and its selling price at the pit's mouth was only 7*d.* per ton, cannot be denied, but as large fortunes were realised at that rate of profit, it will be evident that at much less than the present rate of profit the business of coal working is by no means an unremunerative occupation. The high price of coal has already so seriously affected certain branches of industry to such an extent as to lessen the amount of business done with foreign countries by those engaged in them, and this must soon have the effect of lowering the price of coal to a sufficient extent to ensure the maintenance of the demand; but considering the various circumstances of the case, it is quite unlikely that prices will so far descend as to make coal mining unprofitable. With all the improvements of recent years, our most competent ironmasters have not succeeded in producing a ton of finished iron with less than from 3 to 4 tons of coal; the result being that between 30,000,000 and 40,000,000 tons of coal are annually consumed in the manufacture of iron alone. Thus the various branches of industry are not only affected by the extra outlay they have to incur in the purchase of fuel for the generation of steam, and in the production of such heat as may be necessary for other purposes, but likewise by having to pay a higher price for their engines, boilers, and every piece of machinery into the construction of which iron enters. It is true that prices have not yet gone so high as to enable the Americans to come into our market with iron, but we must have a care not to let prices go any higher, or they will assuredly do so; and the best remedy, undoubtedly, is to encourage colliery enterprise by every means in our power, whilst the profits easily realisable therefrom will be a sufficient justification to capitalists for doing so.

Taking advantage of the unusual facilities for opening new collieries and extending those already in operation which the present condition of the coal trade offers, the Brynycae and Cadley Collieries Company has, as was stated in last week's Journal, been formed with a capital of 250,000*l.*, in shares of 10*l.* each, to purchase two valuable freehold mineral properties of considerable extent in Glamorganshire, together with some adjoining leaseholds to be worked in connection with them, and from the manner in which the capital appears to have been subscribed it may be fairly concluded that the public form a just estimate of their importance. It is shown by the prospectus that the enterprise possesses all the elements of success, since there is an abundance of coal very advantageously situated for working, and a board of direction which includes men of the highest position, practically acquainted with the business and well known in commercial circles, whilst the proportion of the capital remaining after payment of the purchase-money is ample to provide for the efficient working of the property. The entire purchase-money, including the freeholds and vendor's interest in the leases, is 140,000*l.*, of which 50,000*l.* is accepted in shares, so that there is a clear working capital, for no promotion money is payable by the company, of 110,000*l.*, which the engineers who have inspected it consider will be ample to sink the necessary pits, construct the several connections with the railway, and furnish requisite plant, machinery, and working capital for developing the undertaking. The company will have a store of over 60,000,000 tons of coal and over 26,000,000 tons of ironstone to work upon, so that it can readily be conceived that the engineers have not made an exaggerated estimate in assuming that an annual output of 200,000 tons can be obtained; yet this, taking the profit at only 4*s.* per ton, which is less than half that realised for similar coal by other collieries in the district, would give 52,000*l.* per annum, or sufficient to admit of a dividend of 20 per cent. upon the entire nominal capital—a prospect which cannot but be considered satisfactory, seeing that in this estimate the profits from the ironstone are not taken into account, and that as regards the coal there is the capacity for doubling the output mentioned, and, of course, proportionately increasing the profits as the works are developed. Even the *Times*, notwithstanding its usual extreme caution, speaks well of this company, and concludes its favourable notice by declaring that "the board of direction is constituted of men of experience and high standing."

We may add that the shares have been largely applied for, and are in demand at 2 to 2½ prem.

IRON MINING IN SOUTHERN RUSSIA.

The price of iron in England being now so high, in consequence chiefly of the excessive price of fuel, the suggestion is at least worthy of consideration that we should endeavour to retain our demand of at least some share of the business by engaging in the manufacture of the metal in foreign countries, and selling in or exporting from those countries as may be found most advantageous. America, Russia, India, and Australia have been from time to time mentioned as the most attractive for this class of business, and at the present moment a company is in course of formation—the Tiflis Iron Mines and Works—for applying the principle in Southern Russia. The Tchatach mines and works, which the company proposes to purchase, work, and extend, are situated some 30 miles to the south of Tiflis, the capital of Georgia, and as the Russian Government has, by way of encouragement, granted some very valuable privileges, the undertaking is considered to offer unusual facilities for the realisation of fair commercial profits. The Government guarantees 20,000*l.* worth of orders annually, 20 years from July, 1875, at the current rates in Tiflis, or, failing to give these orders, will pay a subsidy of 1000*l.* for every 5000*l.* worth of orders deficient. The capital has been fixed at 155,000*l.*, in shares of 100*l.* each, 50 of such shares issued as fully-paid, being reserved as vendors' shares, and the remaining 1500 being offered to the public. This 150,000*l.* thus raised it is proposed to apply thus:—For purpose of concession, mine, works, machinery, materials, &c., 60,879*l.*; for forest lands (freehold), 17,220*l.*; for payment to Government to make the property freehold, 3000*l.*; for completion and extension of works, 28,715*l.*; and for making tramways, 14,729*l.*; which will leave 23,115*l.* for working capital and contingencies.

The present capacity of the works, which consists of blast-furnaces, foundry, workshops, &c., is equal to about 1000 tons of castings per annum, but it is proposed to complete and enlarge them so as to produce 4000 tons of malleable iron in addition to 1000 tons of castings, so as to supply the Tiflis market with bar and sheet iron, at present imported at great cost. The climate is healthy, transport and provisions are abundant and low-priced, and there is plenty of cheap labour. Extensive forests lying around the works furnish the necessary fuel, and to ensure a perpetual supply of fuel for the production of 5000 tons of manufactured iron annually it is proposed to acquire 52½ square miles of forest land, payment for which is provided for in the estimate above given. The country in which Tiflis is the centre is undergoing rapid development under the auspices of the Russian Government, and is the place of residence of the Viceroy. It is on the high road to Persia and India. Already connected with the Black Sea by the Poti-Tiflis Railway, surveys are now being made for a line from it to Vladikaskaz. The construction of lines to Bakou (on the Caspian) and to the Persian frontier *via* Erivan, is now the subject of consideration with the Government. The population of Tiflis is fully 100,000, and all the iron proposed to be made can be disposed of there at highly remunerative prices. The present rates in that city are—for castings 21*l.* per ton, for bar-iron from 22*l.* to 25*l.* per ton, and for sheet-iron from 50*l.* to 53*l.* per ton. There is every probability of these prices being sustained, as there are no other ironworks in the Trans-Caucasian provinces, and a heavy import duty is levied on iron of foreign manufacture. It is mentioned, however, that common castings can be finished and delivered in Tiflis for 9*l.* 4*s.* 9*d.* per ton, and small bar iron for 10*l.* 4*s.* 9*d.*, so that there would be a very large margin for profit, even allowing for possible depreciation in the selling price of iron at Tiflis. It is calculated that a net profit of at least 40 per cent. on the proposed capital will be made annually.

From an analysis of the iron ore made by Messrs. Johnson, Matthey, and Co. it appears to be free from both sulphur and phosphorus, and to contain of peroxide of iron, 72·50; carbonic acid, 5·00; lime, 1·60; magnesia, 0·85; water, 1·00; insoluble earthy matter, 18·95; loss, 0·10 = 100·00, representing 52 per cent. of metallic iron: whilst from the reports of the mining engineers who have inspected it there appears to be plenty of good mineral on the property, and all necessary facilities for working. Mr. Thomas Belt, F.G.S., Dr. Abich, F.G.S., and Mr. R. Arndt, M.E., have each made careful inspections, and given highly favourable reports. The mine is an open cutting on the face of a hill which rises 300 ft. behind it, the cutting exposing a section of an immense lode of iron glance, or oligiste iron ore. The lode, according to Mr. Belt's report, is 21 ft. wide near the surface, and has increased to 42 ft. in the lowest part of the workings. The strike, or direction, of the lode is east of north and west of south. It passes behind the quarry up to the crest of the hill, and can be traced on the surface for several miles wherever the bed rock is exposed, but no attempts have been made to prove its thickness, as the ore at the quarry is perfectly inexhaustible. The ore varies in produce from 18 to 65 per cent. metallic iron. Abundance of the richest quality of ore exists, but it has been found most suitable for smelting purposes to mix it with the poorer, so that 2 tons of ore produce 1 ton of iron. An average sample of the ore yielded by assay 72½ per cent. of peroxide of iron, and it is, therefore, well suited for the fettling or lining of rotatory puddling furnaces on the Danks and other systems. The ore is delivered by contract at the furnaces, ready broken up into pieces about the size of an egg, at a total cost of 7*s.* 3*d.* per ton. Limestone is found in the vicinity of the mine, and is delivered at the furnaces ready broken for 6*s.* 8*l.* per ton. Excellent clay for common bricks is worked close to the establishment, and materials for making refractory bricks for the lining of the furnaces are found within a few miles. And this, coupled with the facilities for obtaining fuel, &c., already mentioned, would appear to give the company every facility for successful working. The prospectus of the enterprise will shortly be published.

Gas.—Mr. E. T. Moody, C.E., of Templecombe, has patented some improvements in the manufacture of illuminating gas, which are described as passing air through a vessel filled with capillary or absorbent substance, into which

petroleum or its lighter products are introduced. The air charged with vapour is carried off to be burnt.

VIRGINIA: ITS ATTRACTIONS TO THE CAPITALIST AND THE EMIGRANT—No. IV.

ITS MINERAL WEALTH AND NATURAL RESOURCES—*(continued)*.

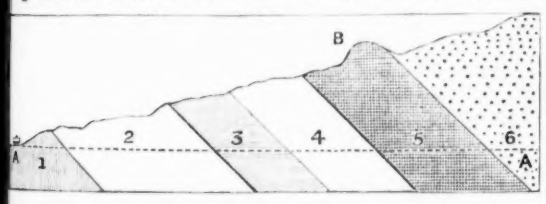
In our last paper we gave a short account of the coal fields of West Virginia, with analyses of the various kinds of coal—bituminous, cannel, and splint. We now proceed to give an epitome of the various kinds of iron ore that are found in these regions, with their analyses.

In the coal measures are found the usual aluminous or clay iron-stones. Some of these are rich, yielding as much as from 35 to 50 per cent., but are more or less contaminated with phosphoric acid. There is also what they call a fossiliferous iron ore, of various degrees of purity and hardness, which occurs on the top of the lower coal measures, immediately under the stratum of black flint which is found in most of the hills in the Kanawha district. Neither of these ores make good iron by themselves, but when they are mixed with the purer and richer magnetic and hematite ores of the eastern parts of the "Old Dominion" a first-class iron is obtained. Being found on the same properties as the coal, these ores would, by their admixture, reduce the cost of the iron, as only the richer ores would have to be brought from a distance. The nearest good ores to the coal are to be found within a distance of 80 to 100 miles by rail. The cost of transport is about $1 per ton for 100 miles, so that is not a consideration, seeing that in Pennsylvania they have, until lately, been dependent on the Iron Mountain of Missouri, or the liquid ores from Lake Champlain, or Lake Superior, for their supply of rich ores for mixing with their local inferior ores. The cost of transport of ores from Missouri or Lake Superior, as may be supposed, is very great, seeing that they have to be conveyed from 800 to 900 miles by rail and river. When, however, the railway connections now being made are completed the Pennsylvanian iron-masters will be able to obtain the hematites and magnetic ores of Virginia at a much less cost.

Pennsylvania and Virginia, although adjoining States, have not till lately been accessible for the conveyance of their mineral treasures from one to the other, but so soon as the railways now in course of construction are finished this difficulty will no longer exist, and they will be able to avail themselves of the rich hematite and magnetic ores of Virginia; and by recent advices from New York it appears that since the opening of the Chesapeake and Ohio Railroad, in the spring of this year, great progress has been made in the development of the mineral wealth of the iron and coal districts through which it runs, and further developments are proceeding rapidly. Already, our New York informant states, 17 coal mines have been opened up on the line of the road, and 7 iron beds are being worked, while 12 iron blast-furnaces are building, and will soon be in operation.

As before stated, the mineral resources of Virginia are boundless, all the hills of the Appalachian range abound in iron ores, some of which are of very superior quality, and crop out from the sides of the mountains, offering great facilities of access. The ranges of mountains adjacent to and which bound the great valley of Virginia generally consist of a great sand rock, that dips at a high angle to the east, forming some of the tops and parts of the eastern slopes of the hills, and as it weathers away unequally gives them a bold, jagged crest line. Under this sandstone are found the principal beds of brown hematite iron ore. It is a hydrated peroxide, and is found in bunches and in irregularly stratified masses, or persistent beds, from 20 to 50 ft., or even more, in thickness; while the other varieties of hematite are mostly found in pockets, or "nests," often of immense extent. The range of brown hematites extends from the Chattahoochee, in Alabama, to the Lehigh, in Pennsylvania, and probably as far as the mountains extend. These beds of ore are persistent, and may be found at any point within the distance named, but are in far greater abundance at some points than others. Through Tennessee and Virginia the ore exists in an almost unbroken line, but made up of constantly changing deposits. Here may be found a thin irregular stratum of ore, imbedded in clay; there a mountain mass of moss-grown rocks of iron, standing up like giants; here a large string of ore, or simply red or ochreous clay; and there a succession of "nests," distributed without strike or conformity.

Below the iron is a thick bed of mottled shales, and in this is found a seam, 12 or 14 ft. thick, of very valuable fire-clay (a variety of kaolin). Under the shales lie conformable beds of limestone rocks, of great extent and value. Below the limestone are brown slaty rocks and shales, reposing on a hard black aluminous slaty rock, containing pyrites, and from which issue aluminous and sulphurous springs, which occur in various localities, to which in the summer resort large numbers of the wealthier classes of the community seeking health and recreation. The valley being at an elevation of from 1000 to 2000 ft. above sea level, the air on the mountains and at the springs is at all times fresher and more invigorating than it is in the lowlands of the same latitude. By reference to the accompanying diagram it will be seen that the various strata which form the mountain slopes dip at an angle of about 45° on the eastern side, and crop out on the western side of the hills, which are all more or less accessible to the hand of man. There the iron ore being harder than the sandstones and shales is less acted on by the elements. In many places the sandstones are weathered away, leaving the ore standing out in high bluffs, or knobs, as shown in the diagram; and as the mountains in almost every case have cross valleys of denudation, descending by easy gradients to the main river, on the banks or level of which the rails are laid, great facilities of access to the mineral treasures of these hills are afforded at little cost for labour, as the cars mostly descend by gravity, and steam or other traction is only needed to take back the empty cars, and control, with the assistance of brakes, the descent of the loaded wagons. It will also be apparent, by reference to the diagram, that the ore beds are of unknown depth and extent, and there is geological evidence for believing that they are coincident in extent with their associated strata.



GEOLOGICAL SECTION, EAST AND WEST, OF IRON-BEARING DISTRICT IN AUGUSTA COUNTY, VIRGINIA.

A, A,—Level of the river and railway.
1,—Black slates.
2,—Brown slates and shales.
3,—Limestone.
4,—Mottled shales.
5,—Iron ores, sandstone, &c.
6,—Sandstone.
B,—Bluff, or mass of iron ores, left exposed by erosion of the softer sandstone by the action of the weather.

Moreover the softer shales and sandstones between the crest of the hills and the iron ores weather away, and not only leave the iron exposed in many places as a series of knobs or shoulders, but at a lower level than the ore leaves a shallow trough, or double as the natives call it, furnishing a very tolerable road bed, along which a narrow-gauge tramway is very easily laid, so that in many instances the cars can be run under the ore beds, and the ore dumped into them as it is raised, without the cost and labour of second handling.

The peculiar facilities in the conformation of the valleys and side valleys recur as often as the successive undulations of the same formation come to the surface, thus by recurring topographical features of the country revealing to the eye the rich treasures to be found for miles and miles along the western slopes of these beautiful hills.

The ores in this region are of several kinds, being what are called fossil ores, block ores, magnetic, and hematite of various qualities. The fossil and block ores are often rich in iron, but these are more or less impure, and are mostly found between hard rocks, in strata which are not above 1 or 2 feet in thickness, which makes them more costly to mine than the richer and more valuable hematites, which literally crop out from the hill sides, as before explained. Where, however, they occur near the coal mines they make, as it has been said, very good iron when mixed with the magnetic ores or hematites, and it is, then, only a question of cost whether it is worth while to use them in admixture with the more valuable ores. The limonites contain as much as from 70 to 80 per cent. of sesquioxide of iron, and sometimes from 1 to 10 per cent. of sesquioxide of manganese, and are well adapted for the manufacture of iron for conversion into steel by the Bessemer process. They also contain uncombined silica in the shape of mechanical admixture, which is no disadvantage, as it facilitates the fluxing and reduction of the ores. The greater part combines with the lime and forms a hard slag, while any that remains in the iron adds to the heat of the iron in the converter, and is burnt off in the Bessemer process. These hematite ores are found both massive and porous, and sometimes decomposed, in beds of great thickness as a thoroughly pulverised mass. If required for transport to a distance it would be advisable to separate some of the alumina and silica by washing, as is done in Pennsylvania. These ores, on an average, yield from 40 to 50 per cent. of metallic iron. In some of the valleys are found pockets of red hematite, and, in the limestone region, of brown hematite. The quantity of these superior ores existing in the mountain ranges of Virginia, which extend for hundreds of miles, is immense, and beyond estimate; and now that the country is opened up by railway it is equally impossible to calculate the wealth they will bring to Virginia, now that they are brought within easy distance of the coal fields of Kanawha. The properties in which they are found vary very much in value, according to facilities of access by which the ores can be got to market, which is the chief desideratum.

Up to this time these ores have been used in small charcoal furnaces; but, as before stated, sometimes mixed with splint coal. But in the furnaces now being built, and referred to by our New York informant, coal or coke will be wholly used, and instead of the 5 or 6 tons a day produced by the charcoal furnaces erected during the war, when the Confederate Government was compelled to fall back on the resources of the country by the blockade, which shut out foreign supplies of iron, the new furnaces will turn out ten times that quantity.

In our next paper we intend to give some account, with analyses, of the limestone of this region, and a brief description of the other mineral resources of Virginia.

FOREIGN MINING AND METALLURGY.

The Belgian iron trade has been characterised by a general depression; it may even be said by an unprecedented disorder. Consumption is confined to daily requirements, and producers finding themselves, to some extent, without orders are restricting their production more and more. Pig especially finds purchasers with some difficulty even at the low rate of 4*l.* 4s. per ton, and many blast-furnaces are being blown out as well in Belgium as in the Grand Duchy of Luxembourg and in Alsace and Lorraine. Iron and plates are supported very feebly, and have been rather declining than otherwise. The first is worth 10*l.* 4s. to 10*l.* 8s per ton, and the second from 14*l.* to 14*l.* 16s. per ton, but these quotations are, to a very great extent, nominal, and business is concluded below them. Everyone is anxiously requiring what the future has in store, and no one can answer in a satisfactory manner, so that transactions exhibit hesitation, and the position of the managers of the great works is difficult and delicate. With the approach of winter even a partial check of work in the metallurgical centres of Belgium would inevitably involve great misery among the laborious Belgian working population, little accustomed of late years to inaction. Better days will, no doubt, return when the financial troubles of America, Austria, and Germany have calmed down, and when the price of coal has also fallen from its present extravagant level.

In France the iron trade continues to languish, and there is little change to note in the importance of the transactions effected. Offers almost everywhere exceed the demand. If we except the single article of rails, the present state of affairs seems little encouraging, and the future appears still more sombre for most metallurgical products. Pig is feeble and exhibits a declining tendency. Merchants' iron only changes hands to a limited extent, and if certain works appear to wish to maintain prices with firmness, others, on the contrary, do business without hesitation at nominal rates much below the semi-official quotations. In the Ardennes iron sells at 10*l.* 16s. to 11*l.* 4s.; and coke-made pig at 4*l.* 12s. to 4*l.* 14s. 6d. per ton. In the Meurthe-et-Moselle pig for refining brings 4*l.* to 4*l.* 12s. per ton.

The approach of winter has a natural tendency to stimulate the coal trade of France; prices remain stationary, but they have not exhibited any further upward tendency. Washed coke has been selling in the Nord at 2*l.* 8s. per ton, on trucks, at the place of working. M. Matrot, engineer of mines, has furnished the municipality of Lille with some interesting information as to the development of coal mining industry in the North of France. It appears that the Pas-de-Calais possesses twenty concessions, of which eighteen are being worked. The department of the Nord comprises twenty-one concessions, of which twelve only are in working. The imports of Belgian coal into France have been gradually increasing of late years. In 1845, these imports amounted to 1,239,400 tons; in 1855, to 2,730,000 tons; in 1865, to 3,665,667 tons; and in 1872, to 3,742,050 tons. In its last session the Council General of the Seine-Inférieure decided that 20,000*l.* should be employed in searching for coal in the department; this sum will be paid to any legally constituted company having for its object the seeking for coal in the Seine-Inférieure, and presenting, in the opinion of the Council-General, sufficient guarantees. The Graissessac United Mines Company has been paying this week a dividend of 16s. per share, less taxation.

The activity which prevails every year on the approach of winter in the Belgian coal trade, in consequence of the necessity which coal merchants experience of laying in supplies, and in consequence of the fear that means of transport will prove wanting, is being now exhibited. A continued firmness in prices is the consequence of this state of affairs; nevertheless, the depression which weighs upon all the industries of Belgium begins to make its effects felt. Consuming works confine their purchases to the coal which they require for the execution of orders in hand, and they decline to conclude long-termed contracts. A fall cannot be expected immediately in a general fashion, but if the economic law of demand alone regulates—as colliery proprietors contend is the case—the price of coal, quotations must experience a considerable decline. This decline appears, indeed, to be already manifesting itself. Thus the Northern of France Railway Company has just concluded a contract with the Anzin Mines Company at a reduction of 5s. per ton. All coming coal is quoted in the Charleroi basin at 1*l.* 0s. 10d. to 1*l.* 4s. per ton. Freights for Paris, notwithstanding the advanced period of the season, remain at 8s. per ton.

Copper has been maintained somewhat more firmly upon the Paris market; Chilian in bars, delivered at Havre, has brought 89*l.* per ton. The Havre market has continued quiet. At Marseilles copper has been very quiet, and quotations have scarcely varied. In Germany transactions in copper have been very limited, the markets experiencing the influence of financial events. The Hamburg market has been rather feeble. Tin has been falling in price at Amsterdam. The modifications which have been introduced in the system of public sales have produced a bad effect on the markets. Banca has made 72½ fl. for disposeable, and 73 fl. for future delivery. At Rotterdam the American crisis continues to exercise an unfortunate influence on tin; Banca has been quoted at Rotterdam at 72 fl. to 72½ fl., while Billiton has made 71 fl. and 72 fl., delivered in November. Tin has experienced a rather sensible fall upon the Paris market. Banca has been quoted in the French capital at 136*l.*, Straits at 134*l.*, and English at 135*l.* per ton. Lead has been rather firmly maintained at Paris, but at Marseilles an advance in lead has been rather suddenly checked without any very clearly defined cause. In Germany lead quotations have been firmly maintained. Zinc has experienced scarcely any variation at Paris. There has been no great amount of business passing at Marseilles; Vieille-Montague zinc, in sheets, has been quoted at 35*l.* 4s. per ton, with a discount of 3 per cent. Zinc has been very quiet in Germany, but prices have been firmly maintained.

FOREIGN MINES.

ST. JOHN DEL REY MINING COMPANY (Limited).—Advices received Oct. 3, ex steamer Liffey, *via* Southampton:—

Morro Velho, Sept. 1.—The measurements this day give the following sinking of the vertical shafts in the month of August:—

	Fms.	Ft.	In.		Fms.	Ft.	In.
A has been sunk ...	5	0	4	Total depth	177	3	1
B has been sunk ...	6	2	3	Ditto	179	1	10
Total in month ...	11	2	7				

Both the sumps are in solid rock.

Advices received Oct. 16, ex steamer Neva, *via* Southampton.

Morro Velho, Sept. 17.—GENERAL OPERATIONS: Since the date of our last advices our general operations have been continued steadily, and with few interruptions.

VERTICAL SHAFTS.—Sinking has been continously carried on in both these shafts, with the exception of two interruptions in shaft A—on the night of the 9th, in consequence of a failure of a joint in the pitwork one core was lost; on the night of the 15th, owing to the excessive and unexpected rain, one of the surface gutters overflowed, and drove the borers out of shaft A for a few hours. The sinks of both continue in sound killas, favourable in its nature for progress, and the rate of advance continues to be very satisfactory.

SINKING FOR FIRST FIFTEEN DAYS OF SEPTEMBER.—Measurements made yesterday morning show the progress attained during the above period to be as follows:—

	Fms.	Ft.	In.		Fms.	Ft.	In.
Sinking A shaft.....	2	3	0	Total depth.....	180	0	1
Sinking B shaft.....	3	0	8	Ditto	182	2	6
Total sinking	5	3	8				

This advance is again exceedingly creditable to all parties concerned in the sinking operations.

At present we are about deep enough to prepare the driving towards the lode. This will now be considered and settled. We shall begin driving from A shaft tomorrow to cut the lode the sinking being continued for the present.

FERNAM PAES—GAIA MINE.—The quantity of mineral obtained from this mine has been maintained. On Sept. 6 in consequence of a local movement in the footwall, which is now being secured, our stoping space was limited; nevertheless, a fair supply of ore is being obtained for the stamping-mill, and the unsafe ground will be shortly made good, when our operations in that section will be resumed.

COST AND LOSS.—The produce at Morro Velho for the month of August amounts to..... 250·8 oits.
Less loss in melting ..... 2·3 „
248·5 oits., at 8s. per oit..... £ 99 8 0
The cost, less sums receivable from the road contracts is Rs. 8037 $360, at exchange 25¼d. 862 6 10
Loss on the month's working..... £762 18 10

FERNAM PAES ESTATE.

The produce obtained in August amounts to—
From Gaia..... 487·0 oits.
From Matto Virgem ..... 72·8 „
559·8 oits.
Less loss in melting ..... 4·8 „
555·0, at 8s. 6d. per oit. £235 17 6
The cost being Rs. 3175 $890, at exchange 25¾d. 340 14 10
Loss on the month's working..... £104 17 4

COST—VERTICAL SHAFTS.

Sinking, timbering, and pitwork, Rs. 13,174 $467, at 25¼d. £1413 10 2
Surface works, Rs. 3224 $627, at 25¼d..... 345 19 6
Total outlay £1759 9 8

The loss at MORRO VELHO has been increased by a falling off in the produce, and by several items of cost being exceptional.

At FERNAM PAES the cost is increased from a like cause, but the produce is improved.

The expenditure on VERTICAL SHAFTS is heavy, being due to the increased quantity of timber and pitwork which is being used in keeping the brattices, timber, and pitwork in as an advanced state as practicable, and as such should be considered judicious.

DON PEDRO.—Report for August: Produce, 6228 oits.—2646*l.* 18s.; cost, 3174*l.* 19s. 7d.; loss, 527*l.* 18s. 7d. We have pleasure in reporting a slight improvement in the quality of the ore returned, which has been taken from Canoa, Nos. 6 and 8 shoots, and No. 4 gulley. As advised in the fortnightly letter of the 16th inst., we have commenced to open on each shoot for convenience of commencing stoping operations, and samples from each point are indicative of continued richness—in fact, our hopes are even stronger than ever that Maquiné will be a lasting, dividend-paying mine, and we believe that, notwithstanding the prejudices we have to battle against (if we are allowed to work the mine as its appearance demands), the long and tried patience of the shareholders will shortly be replenished with a good harvest. In order to properly develope the mine, and get it into an efficient working condition, we must sink our shafts for drainage, which cannot be done without the permanent pumping machinery, or a thorough renewal of the rods in connection with the temporary pumping machinery (the present rods being weak and by no means dependable), and a larger lift of pumps, &c. Sketches for all that may be required for the latter arrangement will be prepared and handed over to the manager as early as possible. We propose iron rods, as the iron can be be utilised for general purposes after the permanent pumping machinery is put in motion.—First Division of September: Produce weighed to date, 2906 oits. The works in hand have been continued favourably for the last fortnight, and the ore obtained has been of very fair quality, and derived from canoa Nos. 6 and 8 shoots, and No. 4 gulley. A small amount of boxwork has been taken from the pillar of ground being stoped between the canoa and curve, which has proved to be very productive. On the 14th inst. eight boxes of ore—9·66 cwts. yielded 380 oits., and on the 11th inst. seven boxes—8·45 cwts., produced 406 oits. of gold; this we deem favourable towards a continuation of richness in depth. The water, which is being efficiently kept out of the mine, is much the same as last advised.

ROSSA GRANDE.—Report for August: The cost, inclusive of 146*l.* 14s. charged towards the erection of Bahu stamps, and 19*l.* 3s. 8d. on account of aqueduct Corrego das Velhas water-course, amounts to 1165*l.* 6s. 10d., and the produce 1585 oits.—First Division of September: As the value of the backs laid open will now be proved by stoping and stamping it will no longer be necessary to estimate their yield. For the future the mine report will contain the number of fathoms stoped during the month. There has been a great amount of work performed in the mines independent of driving levels.—Bahu: The sinking of the sump is being forced on, and the lode continues without change. The lode in the 38 east has increased in size, being at date 5 ft. wide, whilst that in the 38 west has contracted to 4 ft. wide. The winze in the bottom of the 18 west is communicated to the 28. Stoping in the back and bottom of the 28 east and back of the 18 west is being carried on with a small force.—Cachoeira: We have at present a small force employed in this mine. The lode in the back of the 10 east is of a bunchy nature, but continues of average yield.—P.S. Since writing the foregoing a heavy shower of rain, and the indications are that we shall get more shortly.

RICHMOND.—Cablegram from the mine:—"Hall, London: Week's run, $33,000, two furnaces, mine developing splendidly. Profit for September. $87,000.—M'GEE."

SIERRA BUTTES (Gold).—Result of the working at the Sierra Buttes and Plumas Eureka Mines for September:—Receipts, $30,000; mills only doing half duty, owing to short supply of water. Usual details not yet received. Plumas Eurkeka Mine: Receipts, $27,487; cost of mining and milling, $12,126.

COLORADO TERRIBLE LODE.—Monthly statement for August: Ore raised during the month—1st class, 8 tons 1500 lbs., value per ton $700 = $6125; 2nd class, 20 tons, at $130 = $2600; 3rd class. 130 tons, at $12 = $1560; 3rd class rock, 86 tons, at $10 = $860: total, $11,145.—Month's expenses: Management, $321·41; mining cost, $5110·35; ore 1st class, title, incidental and office accounts, $67·26; powder, materials and construction accounts, $511·31 = $6010·33, leaving a balance of $5134·67. The 33rd shipment arrived on Sept. 13, per Russia. The two shipments (32nd and 33rd) now in Liverpool are roughly valued at 2300*l.* gross. The two on the way, dispatched Sept. 6, are expected to reach Liverpool in about a week. After providing for advances these four shipments are expected to leave a balance in hand of 3000*l.* cash. The mining operations of the company are not interrupted by the winter, and the shipments by the agent will continue as usual. The debenture debt of the company has been further reduced from 4200*l.* to 4000*l.* A telegram from the agent, received on 13th inst., reports the dispatch of another shipment consisting of 11 tons 1st class ore.

BIRDSEYE CREEK (Gold).—G. S. Powers, Sept. 27: I shall commence to raise shaft in Neece tunnel about Oct. 1, but shall continue to drive tunnel ahead at the same time, as it will be necessary to drive the tunnel about 50 ft. further, after which we shall make open-cuts, which will be cheaper and very much better. We shall commence to construct flume at the same time, that we may be able to commence washing when the shaft is through. I am making such outlays as I deem necessary for next season's washing, and am looking forward to a prosperous season for the Birdseye Company, all things being favourable.

CHICAGO (Silver).—W. S. Godbe, Sept. 27: The left drift is now in 50 ft. from this point: the turns square off to the right; 10 ft. in shows a good face of ore about 5 ft. wide and high. In the right drift we have been blasting, in order to make room for barrow, as it is too far to shovel ore—it is in 100 ft. Yesterday, at the bottom of the incline, we came on a small cavern—we can see down it for 10 ft. or more. The ore is now going down and off to the right from the roof to the bottom; so far it is 12 ft.; the ore is apparently of a better class, and more galena in it. We shall continue to sink on this. We have a considerable quantity of ore piled up on the mine. The engine is nearly ready.

Sept. 25.—I measured the depth of ore at the end of the incline this morning, and find we are nown 20 ft. in very fine ore: we have now to cut down some in order to get the track down. We have passed the ore at the end of the right hand drift but about 20 ft. back have started off to the right, and are taking out some very fine ore from there. The left drift is not working, as we are blocked with ore there.

CHONTALES.—The directors have received a letter from Mr. Smeddle, *viz* New York, dated Sept. 4:—"Ore crushed during August 1930 tons, which produced 415 ozs. of gold, or an average of 4½ dwts. per ton; value of the gold, 1246*l.*; cost for the month, 634*l.*: leaving a profit of 612*l.* The above cost includes the sum of 60*l.* expended on progressive works, and extraneous charges. San Sebastian Mine is reported to be opening out well, and the health of the establishment good."

BENSBERG.—J. W. Hoffmann, Oct. 11: In the open-cast there is no change to report since my last. The steam-winch is in work, and we are now hauling stuff up the inclined plane. The wash ore from the open-cast is at present very good, so that the production of the dressing machinery has improved consi-

derably.—Production of ore for the week: Carbonate, 15 tons, assay 50 per cent.; stock on hand ready for delivery, 25 tons carbonate.

WEST CANADA.—Sept. 24: Huron Copper Bay: The stope in the bottom of the 50, west of Palmer's shaft, will yield 3 tons of copper ore per fathom, and in the back of the 50, east of this shaft, there is a stope yielding 3 tons per fathom. A stope under the 35, west of Bray's shaft, is producing 2½ tons per fm.

LUSITANIAN.—Oct. 7: Palhal: The lode in River shaft below the 130 is 9 feet wide, composed of quartz.—Levels on Basto's Lode: In the 170, east of Taylor's shaft, the lode is 9 feet wide, of no value. In the 170 west the lode yields stones of ore, and is 10 feet wide. The eastern end of the 160 is quartz entirely, but the western end yields 1¼ ton of ore per fathom. In the 150 east the lode is 5 feet wide, composed of quartz and country, and in the 140 east of the same size containing quartz and gneiss. In the 140, west of Taylor's, and west of the slide lode, the lode is about 1 ft. wide, of flookan and schist. East of River shaft, at the 130, the lode is 7 to 8 feet wide, of hard and loose quartz; at the 120 and 110 2 feet wide, of quartz; at the 90 6 in. wide, composed of flookan; at the 80 1¼ ft. wide, of quartz and flookan; and at the 70 5 in. wide, dry flookan. The branch in the 38, west of slide lode, west of Perez' shaft, is 6 in. wide, unproductive.—Mill Lode: The 38, west of the slide on this lode, is very poor, and the lode is only 8 in. wide. The slide lode in the 130 is about 1¼ ft. wide, and composed of flookan. The ground in the adit cross-cut, south of branch, is not very hard, and is giving out a little water.—Carvalhal—Great Lode: At the 40, east of Incline shaft, the lode is 1½ ft. wide, composed of country quartz and spots of lead ore and mundic; there is plenty of water coming from the end.—Copper Lode: In the deep adit level, west of River Caima, the lode is 6 in. wide, composed of mundic and spots of lead.—Valley Lode: In the top adit level, east of River Caima, the lode is 1½ ft. wide, composed of mundic and soft country.

MENZENBERG.—Capt. Roskilley, Oct. 11: Dickins's Engine-Shaft: The ground in this shaft below the 24 is become a little harder for sinking, but judging from its appearance and character we think that we are near the lode or branch. There is no change in other parts of the mine.

[For remainder of Foreign Mines, see to-day's Journal.]

CALIFORNIA HYDRAULIC MINES OWNED BY ENGLISH COMPANIES.

A SHORT WATER SEASON, AND ITS EFFECTS.—In so far as water for mining purposes is concerned, this is the driest summer we have had for the past ten years, the water season having been four or five weeks shorter than usual. At the present time but few hydraulic companies are washing at all—none with more than a single pipe. But for this early failure of the water supply the yield of the placer mines in this part of the State, where many claims have lately been outfitted and opened up on an extensive scale, would have been large, whereas it will now scarcely reach an average. This, however, applies only to the hydraulic and to such drift claims as have not water for washing, the out turn of the quartz mines having been larger the present season than ever before. That the water should have shortened on us just now is unfortunate, as it was desirable that the several English companies, who had lately invested heavily in this neighbourhood, should have been able to make a good showing this summer. As it is they have not done badly, only come a little short of what was expected, and of what with the ordinary supply of water they would have accomplished. They should not be discouraged, however, as they have, without an exception, secured valuable properties, and these extreme dry seasons occur only once in the course of ten or twelve years, being due to a light and late fall of snow on the mountains.

THE BIRDSEYE CREEK AND THE SWEETLAND CREEK CLAIMS.—Across Steep Hollow, lying close under the ancient mining hamlet of You Bet, is situated the thoroughly fitted up and well managed group of claims of the Birdseye Creek Company, sold three years ago, with the accompanying ditch, to English capitalists. It has paid from its net earnings dividends ever since, and a costly bed-rock tunnel having just been completed, admitting of the lower and richer stratum of gravel being attacked to advantage, the revenues of the company are likely to be much enhanced in future. It was bought at a reasonable figure, and has not been so outrageously overstocked as have many other properties. This company have gravel enough to last them for twenty or thirty years. The most of it is of good grade, a section of a very rich blue lead passing through their ground. Their prospects, to say the least, are excellent, and there is every reason for believing that the shares of this company will advance on present prices.

Further to the north-west, and near the junction of the main and South Yuba, lie the rich, deep, and admirably outfitted grounds of the Sweetland Creek Hydraulic Company, which passed into the hands of the present proprietors several years ago. In some respects this may be regarded as a model mine of its class. The natural advantages of an outlet scarcely anywhere surpassed have been turned to the best account through the construction of a set of under currents, sluices, dumps, and other appliances, that approaches as near perfection as anything of the kind yet built in the State. In keeping with these complete arrangements we find here a business administration marked by a high degree of energy, good judgment, and economy. As a result this property, which may now be considered as only fairly opened, has paid satisfactory dividends ever since it passed under British ownership, notwithstanding a large portion of its current earnings has been expended in running a long and expensive bed-rock tunnel, now just completed, and in the construction of other costly and permanent improvements. This property has been capitalised at $300,000, about one-third more, it may be presumed, than the original owners received for it. For the future its earnings will be much larger than heretofore, and a corresponding rise in the price of shares, which have always been held in favour on the London market, may be predicted.—*San Francisco Bulletin, Gold Run, Placer County, Sept. 8.*

PRINCE PATRICK MINE—MONTHLY REPORT.

Oct. 14.—The south-west drift and stope above the 100 yard level has much improved during the last few days, and much more compact measures have been entered into, which is of importance in every respect for the future of the mine. The back stope to it working north is without alteration to note, and is worth about the same value for lead as we have had it for a long distance, and returns on an average nearly 3 tons to the fathom. The 100 level driving north upon Parry's lode, is without change, and but little work has been done since my last report, as the men were needed to assist the shaftmen to make full pires. The shaftmen are engaged in making a dam on the 100 level, west of Campbell's engine shaft, to back the water and force it along the said level to the great swallow, and as soon as the new iron pipes are laid down, which work will occupy us a full fortnights' time, we shall then have so prepared the mine that no floods whatever can interfere or cause any impediment even in the wettest seasons, and the whole mine below the said 100 level can be worked dry at all times. The 120 level, driving east upon the Pant lode, is without any change, and is going through a strong vein of carbonate of lime, with occasional ribs of lead, and is rather stiff to cut so far.—Hughes's Shaft: The winze sinking from this shaft is progressing well, the measures also are becoming more congenial for bearing mineral, and some few lumps and thin strings of lead are beginning to make their appearance in the last few feet of sinking. The mine all through is in good working order, and as soon as the piping to convey water to the swallow is completed we shall be thoroughly safe from any floods that might impede our progress in developing the several lodes that we have discovered. We have just sent off 10 tons of the 20 tons of round ore sold at 17*l.* per ton, and I have been offered 15*l.* 5*s.* per ton for a parcel of our small ore—about 25 tons.—J. LLOYD.

CORNISH PUMPING ENGINES.—The number of pumping-engines reported for August is 18. They have consumed 1726 tons of coal, and lifted 12·2 million tons of water 10 fms. high. The average duty of the whole is, therefore, 47,800,000 lbs., lifted 1 ft. high, by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

Crenver and Wheal Abraham—Pelly's 80 in.	Millions	55·2
Ditto —Willyams's 70 in.		55·1
Dolcoath—85 in.		58·4
East Pool—80 in.		54·3
Great Work—Leed's 80 in.		49·2
West Chiverton—New 80 in.		55·3
West Wheal Seton—Harvey's 85 in.		54·8

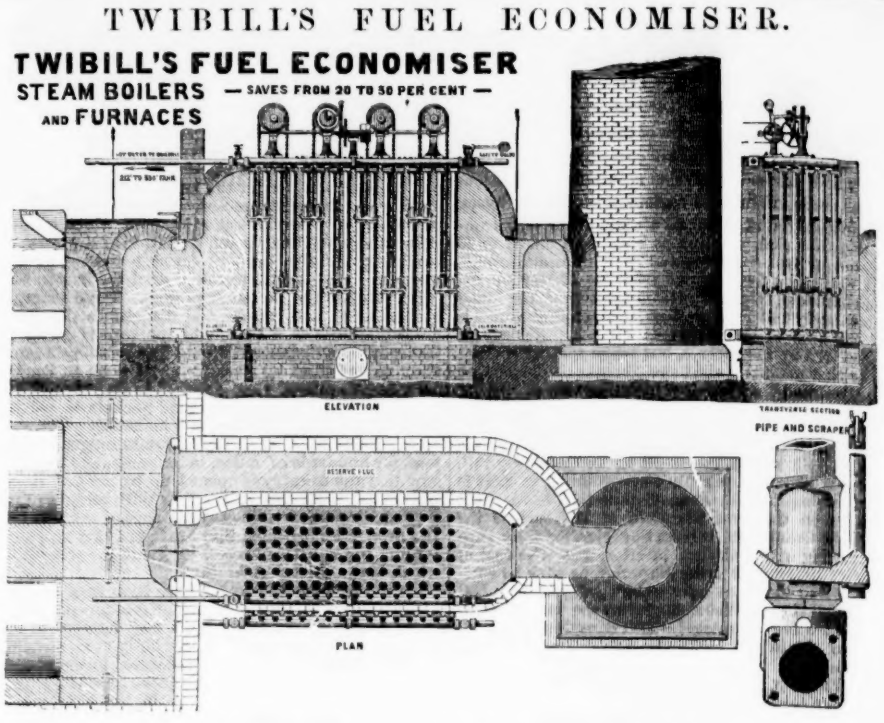
DRAKE WALLS MINE.—Mr. Samuel Searle, Sticker, has obtained the contract to erect 100 heads of stamps at Drake Walls Mine.

EAST SETON.—The 70 fm. level from Henrietta is coming in under 20 fms. under Cartwright's, and is worth fully 3 tons per fathom; Cartwright's shaft below the 48 is worth fully 2½ tons per fathom; the 48 fm. level east of this shaft 2½ tons per fathom; stope in back of the 48 worth 5 tons per fathom. This mine is in the rich Seton district, and is worked at a comparatively easy cost.

WHEAL MARGARET.—These shares are still quoted very low, at 1 to 1½, or barely 1000*l.* for the mine; yet they have recently had an improvement in the mine, which, should it continue, will again put them in a good position. The lode appeared to have been missed at the 70 fm. level on the Foul lode; they now find it standing to the north of the old working. The shaft apparently was not sunk on the main part. Should their expectations in this respect be correct, it will no doubt be a good thing for the adventurers. In a short time we hope to be able to say more about it.

CORNISH MINE SHARE MARKET.—The Share Market still continues somewhat quiet, although a little more business has been transacted towards the close of the week than for the past week or two, and there seems to be a better tone prevailing, and confidence to some extent is springing up again. West Tolgus, South Carn Brae, and Rosewall Hill have been in better demand, and there have also been a few transactions in dividend mines. There has been no further reductions in the tin standards, nor does the state of the market look worse. The following are the closing prices:—Carn Brae, 75 to 80, rather quiet. The price of Cook's Kitchens has declined to 13, 14, but there are scarcely any transactions in shares. A few Dolcoaths have changed hands at about 45½ to 46¼, but on the whole not much has been doing in them. East Basset, 14 to 15. East Pool, 7½ to 8; no transactions reported. East Lovell called 12½ to 13⅝. Great Wheal Vor, 3 to 3¼, quiet. Providence, 7 to 8; not much business doing. Rosewall Hills have been more enquired for during the week, and shares are now become very scarce at 14*s.* to 16*s.*; we hear that one part of the mine is worth 15*l.* per fathom, and in another part the agents are expecting an important discovery, hence the demand for shares. South Carn Brae has advanced from 2¾ to 3⅝, 3⅝, and a fair business has been done, the mine having improved for copper in the 150 end. At the meeting on Monday no call was made. South Condurrow, 5¾ to 6, firm; this is one of the few mines the price of whose shares have not been much affected by the recent depression. South Crofty, 23 to 25, but nothing doing. South Frances, 6 to 7, quiet. St. Ives Consols called 8 to 9. A little business has been done in Tincrofts, at about 44 to 45. Unity Wood, 17*s.* to 19*s.* West Basset, 7⅛ to 7¼; we continue to hear good reports of this mine. West Chiverton 4 to 4⅛. West Frances, 7 to 9. West Seton, 32 to 34; we hear they have a good improvement for copper in the 140 going west. This is an important feature in the mine, as there is a large quantity of virgin ground on the run of the lode. We hope soon to see this mine re-enter the Dividend List. West Tolgus firmer, and in better demand, at 30 to 31. Wheal Kitty (St. Agnes) still maintains the price which shares have been at for some time past—11½ to 12, firm. Wheal Seton, 29 to 31. Wheal Uny, 2¾ to 3, quiet.—*West Briton.*

TWIBILL'S FUEL ECONOMISER.



TWIBILL'S FUEL ECONOMISER.

Although considerable inconvenience has been felt by those engaged in industrial enterprises in consequence of the enormous price which it has been necessary to pay for fuel, it is not unlikely that much benefit will ultimately be derived from the efforts which it has called forth to devise methods of economising fuel by securing more perfect combustion, and by utilising the heat which had previously been permitted to go to waste. The improved patent fuel economiser invented by Mr. JOSEPH TWIBILL, of Hulme, Manchester, belongs to the latter class, and it is claimed that by using up the surplus heat passing through the main flue beyond the boilers, varying from 250° to 500° more than is needed for a sufficient draught, it raises the temperature of the feed water so as to effect a saving of from 20 to 30 per cent. in the cost of firing the furnaces. It is mentioned that the principal recommendations of the machine, which (as now constructed with latest improvements) has become a prime necessity, are simplicity and accessibility in arrangement, combined with durability and efficiency in working, resulting in a decided superiority over every other apparatus professing, by similar means, to economise fuel in the working of steam-boilers. All joints are turned and bored, or planed face to face, and fitted iron to iron, and each machine is proved at six times the pressure of the boilers to which it is applied. Special provision has likewise been made for getting access to all the working parts by merely removing the covering plates, so that without disturbing a brick anything necessary may be effected from the top, instead of having to stop the machine, take down the brickwork, and lift out the whole or part of the apparatus, as happens with other machines. The invention has, moreover, the great advantage that it can be applied to any description of boiler without inconvenience or stoppage, and by its adoption there is an increase of steaming or driving power, and also increased safety in working the boilers.

The economiser is extremely simple, being merely a tube boiler placed in some convenient position, immediately beyond the back of the furnace; and, although there may be nothing particularly novel in the principle itself, Mr. Twibill is entitled to the fullest credit for having been the first to make its application a success, such success being due to the careful attention given to the construction and fitting of the joints, and to the excellence of the workmanship put in. The tubes are set vertically in a brickwork casing, and are carefully tested after they are in place to a pressure of 500 per square inch. In using the apparatus nothing more is done than to draw or force the feed-water through the tubes to the boiler, the result being that the boiler receives the feed at an average temperature of 280° Fahr., the lowest temperature, that in the morning, when the apparatus has cooled down during the night, never being more than 40° below this, except on the Monday morning, when, of course, it is somewhat lower. In London the invention has hitherto received comparatively little attention; but in Manchester, Oldham, Preston, Leeds, Bolton, Blackburn, Rochdale, Glasgow, Edinburgh, Dundee, and other great manufacturing centres, the economiser has been very extensively applied, and in every case has also given the utmost satisfaction. The testimonials received are of the most gratifying character. Thus Messrs. Cocker Brothers, of Sheffield, say that "on examining their coal account they find a clear saving of 15 to 20 per cent., besides the advantages they derive in other respects;" and Messrs. Samuel Osborn and Co.—"We could not keep our works going without its aid except with additional boilers, which would use more fuel, and the water passing through is nearly as hot as the steam in the boilers;" and Messrs. M. S. Maynard, of Preston, "consider it saves about 20 per cent. in fuel, and has thereby already paid its prime cost." Messrs. Morris, Pollok, and Son, Glasgow, say—"We find the saving in our coal fully 25 per cent." Messrs. Tech, Heys, and Sons, South Arthurlie, near Glasgow, who have applied them to above 20 boilers, say—"We have no hesitation in saying that the saving in fuel is at least 20 per cent." Messrs. Ewan, Young, and Co., Verdant Works, Dundee, say—"We have had Twibill's economiser in constant operation for over eight years, and it has done its work entirely to our satisfaction—in fact, it gives us no trouble." Messrs. Wm. Romaine, Callender, and Co., Manchester, say—"After using Twibill's economiser for some considerable time, we are perfectly satisfied with it." Many other testimonials of an equally satisfactory character might be selected, but these will suffice to show the appreciation which the economiser receives. Also steam users in Germany and on the Continent are using them on an extensive scale, to their great profit.

In connection with the economiser, Mr. Twibill has a very ingenious arrangement of double-edged and self-acting scrapers, which clean the pipes both up and down from top to bottom, and are used, as the best method of preventing the soot, as a non-conductor, from interfering with the utilisation of the waste heat passing through the flues. These scrapers, supported by the inclined planes of the scraper bar, to which they are carefully adjusted, closely grasp the pipes, keep their position, and do their work thoroughly, without any complicated fastenings, and are also free from the common objection of wearing themselves flat by oscillation, which is a most important point in considering the relative merits of apparatus of this class. The scraper consists of a ring, having its lower and upper edges chisel-shaped, and slightly helical; the ring itself is split, and has a slightly spiral spring action, which keeps the chisel edges pressed to the tube-surface. The ring has two pairs of lugs, or projections, on it; and the bars used to lift the ring have wedged-shaped projections, which fit into the spaces between the lugs. Thus, the ring so rests on two wedges that, if it be pressed with any force downwards, or if the wedges be forced up, these wedges tend to press the top ring to the tube, and at the same time open the bottom ring, and ease it from the tube in the upward motion; while, on the other hand, if the wedges and ring are lowered, then the bottom ring embraces the tube closely in the downward motion, and removes all carbonaceous matter adhering to the tubes, and tending to prevent the free transmission of the heat to the water within the tubes. The economiser and scrapers together form a most important invention, the industrial utility of which can scarcely be over estimated.

NEW FUEL PATENTS.

Mr. J. WOLFFRAM, of Blackheath, Mining Engineer, has patented some improvements in the mode of and apparatus for preparing peat for use as fuel. The peat after it has been taken from the bog is pulped in a pulping mill; apparatus so constructed as to destroy its vascular structure. It is then moulded into blocks, which are removed to a drying house or shed, wherein they are subjected, in the first instance, to the atmospheric temperature, and are gradually passed forward into a regularly increasing temperature, whereby their drying is speedily effected by superficial evaporation, so that the pores close up gradually and finally as they yield their moisture. The drying house is provided with either an endless chain, supported by a suitable platform, and provided with projections, or with shafting and teethed wheels taking into racks in the sides of the carriages, or with equivalent arrangements, whereby the carriages carrying the trays or shelves upon which the peat is laid are moved forward at a slow but uniform or uniformly intermittent rate, so as to pass gradually onward from the entrance at the opposite end of the drying-house, which throughout its length or nearly so is heated by means of flues, which are heated by suitable furnaces; the sizes of the furnaces and areas of flues gradually increasing as the further end of the drying house or chamber is approached. A current or currents of cold air is or are drawn into and along the drying house, the temperature of such air becoming gradually higher as it approaches the further end of the drying-house, whence the heated air escapes up a tall chimney-shaft or shafts. In some cases the ends of the drying house furthest from that at which the carriages enter is surrounded by heating flues, whereby a very high temperature is maintained in such portion, for the purpose of baking the peat after it has been thoroughly dried in its passage through the gradually increasing temperature of the drying house, as above described. For discharging the dried and cooled cakes or blocks of peat from the perforated shelves of the truck, a suitable spout or shoot is provided, with stops or projections, whereby the shelves are tilted to an angle, arrangements being provided whereby the shelves are caused to resume their original position. In some cases, after having dried the blocks or cakes of peat as described, it is submitted to the action of superheated steam in coking ovens, for the purpose of disengaging the greater part of the hydrocarbons, and thus coking the peat or converting it into what is known in France as charbon roux.

Mr. H. THORP, of Elstree, improvements in the manufacture of artificial fuel. The artificial fuel which forms the subject of this invention consists mainly of shale, schist, coal hoppings in combination with sawdust, lime-wash, and pitch or tar.

Rev. G. FORBES, of Broughton Rectory, Northampton, improvements in balls, bricks, or blocks to be used as fuel. According to his invention, he utilises the heat ordinarily wasted in the burning of cements and the fine ashes of plasters, by mixing with the substances usually employed to make these articles enough combustible matter and carbonate of lime to form a good fire-ball or brick for fuel, which, after being thorough burned and then reduced to a fine powder by crushing, is capable of making a good cement or plaster.—The Rev. H. Forbes has also patented an improved compound to be used in the manufacture of cement, plaster, artificial stone, and other similar materials, also applicable for use as fuel. This invention relates to a compound of chalk or limestone, tar, or other bituminous matter, vegetable or animal oil, fat, or fatty matter, naphtha, or without petroleum. The compound thus formed is burned, and then crushed, and finally pulverised. When the said improved compound is to be used as fuel it is made into balls of convenient size.

Messrs. H. STEEL and R. GARLAND, of the Wharncliffe Works, Sheffield, an improved construction of domestic stove for economising the consumption of fuel and utilising the heat thereof. This consists of a hot air stove or grate with open fire, all the heating portions of which project into the room in place of being recessed as in an ordinary fire place. The dome or projecting canopy consists of a double cast-iron metal casing, with gills or ribs of cast-iron running round, through which cold air is admitted from without or from ventilators fixed in the bottom.

The Hon. ROBERT FLOWER, of Durrow, Queen's County, a new or improved fuel. This consists in the employment of fuel of Irish culm, which is reduced to powder, subjected to pressure, and stoved. This is used either alone or mixed with bituminous coal or pitch or other suitable binding material.

Mr. F. L. ROVEDINO, of Botolph-lane, London, improvements in the manufacture of artificial fuel. The features of novelty of this invention consist in combining together coal-dust, small coal, cinders, peat, wood shavings, wood chips, sawdust, or other cheap materials, with melted pitch, resin, asphalte, or other inflammable adhesive substance—these ingredients being further held together by a framework of wood, arranged in the form of a quadrangle or polygon of any number of sides.

Mr. D. K. CLARK, of Buckingham-street, Adelphi, Civil Engineer, improvements in machinery and apparatus for the manufacture of peat fuel and peat charcoal. The object of the first part of this invention is to break up raw peat, and reduce it to a pulpy and non-elastic condition, by means of an improved arrangement of machinery for this purpose.—2. To separate by mechanical means a portion of the water usually found in combination with peat in its natural state.—3. To evaporate the remainder of the water or moisture out of the peat to convert it into peat fuel by means of improved arrangements of drying chambers and apparatus for this purpose.—4. To convert the dried peat into peat charcoal by means of improved arrangements of retorts, furnaces, and apparatus combined therewith for this purpose.

Mr. G. KEMP, of Railway Approach, London Bridge, a new or improved artificial fuel. The specification of this invention describes manufacturing fuel from a combination of chalk, coal dust, sawdust, tar or pitch, and clay.

ELECTRO-DEPOSITION OF TIN.—The invention of Mr. T. FRAS, of Birmingham, electro metallurgist, consists of solutions made and used in the manner described for the deposition of tin by electricity. One consists of a solution of protochloride of tin, to which are added a solution of hydrate of potash and a solution of cyanide of pottassium, and, lastly, a solution of pyrophosphate of soda. Another consists of a solution of protochloride of tin, to which are added a solution of pyrophosphate of soda and a solution of muriate of ammonia. Another consists of a solution of protochloride of tin, to which a solution of muriate of ammonia is added. Another consists of a solution of protochloride of tin, to which are added a solution of tartrate of potash and a solution of hydrate of potash. The proportions of the several solutions which are mixed together are described, also the battery power employed and the temperature of the solutions.

ROOFING.—Mr. J. L. NANCARROW, of Grampound, Cornwall, has patented some improvements in roofing, and in tiles for the same. This invention consists in the construction and in the employment of roofing tiles with ridges and grooves, in combination with locking pieces or tiles made to fit over the parts where two tiles meet, whereby roofs that are constructed with tiles and locking pieces are rendered very durable, and perfectly waterproof, while at the same time the cross laths now used may be dispensed with; a nail, with cup-shaped head and leather-washer, is described.

NEW MODE OF LEAD ASSAY.—Mascazzini heats the ore to be valued with twice its weight of ammonia sulphate; the metals present are thereby converted into sulphates. By boiling with a mixture of diluted hydrochloric and sulphuric acids, all iron, copper, &c., are dissolved, whilst lead sulphate and silver chloride are left. These are washed, dried, and reduced with zinc and hydrochloric acid; the resulting metallic mass is fused in a carbonate, five of borax and five of starch. Ceruse, minium, ores rich in silver, gold, antimony, tin, copper, &c., and analogous substances may be thus assayed. If there is not enough lead present for cupellation of silver ores more may be added.—*Dingler's Polytechnic Journal.*

VIENNA EXHIBITION—No. V.

Russian Minerals—(*Continued.*)

Capital specimens of malleable iron and of fine castings, including vases, busts, statuary groups, &c., are exhibited by the Rastorgouien Trustees from Ekaterinbourg; as well as plain and polished iron plates. Another branch of the works is situate at Krasno-Oufimsk. The entire establishments yield annually 15,000 tons of cast and pig iron, and 7000 tons of sheets and bars, whilst of fine castings the produce is 1500 tons. In these works, as indeed in many of the Russian establishments, women are employed. The total working staff is 5500. Here also are two nail making factories, which turn out 100 tons of nails annually. These are nearly all made by machinery. There are five blast-furnaces, and several steam-engines, and an immense number of water-wheels, having a total power of 1240-horses.

From Stenbock-Fermor metal works, in the district of Krasnoufimsk, there are copper and iron ores exhibited, and specimens of the manufacture in ingots, wrought copper bars, sheets, and wire; also iron plates and bars, and some examples of charcoal from pine wood, which plays so important a part in Russian metallurgy. An excellent model of the works is also shown. The three chief works, though established last century, are well laid out, and comprise seven blast-furnaces and eight refineries, with correspondent accessories. The annual output is 20,000 tons of crude iron, 6000 tons of bar and rolled of various sections, and 300 tons of polished copper, giving a total value of 208,000*l*. Near to these works are the famous mines of Mount Blagodat, where an extensive vein of magnetic iron ore is worked, and has been productive for the last century, yielding an excellent quality of metal of late years, largely used for military projectiles.

In 1863 was founded the Royal Perm Cannon Foundry, arranged for the best models, and with a due appreciation of the experience gained in our English establishments. These immense works are, from their excellent arrangement, regarded as about the best appointed of their kind in Europe. Capital specimens of steel bars turned in the cold are exhibited; and the model of a gigantic steam-hammer, weighing 50 tons, lately erected, whose anvil block, cast at the works, weighs, it is said, 600 tons. Cannons are here made, cast, wrought, and steel. In the armour department there are exhibited several fine specimens, and notably a beautiful 9-in. in steel, made for the French plan. An improved carriage for cannon is also shown from this work, according to the design of a Russian officer. We next come to a stall furnished by the united mines of Ekaterinbourg. Here are arranged specimens of auriferous quartz, and of the alluvial sands, which form the chief source of the precious metal. These crushed specimens are shown in each stage of concentration, and are accompanied by models of the apparatus used in washing the gravel. The mines and dressing-floors date from 1812, and are the oldest in this part of Russia. Indeed, it was here that the Russians made their first systematic attempts to mine for gold in Europe. The matrix is coarse silicious sand, which is productive in certain thin seams, not otherwise distinguishable than by the auriferous qualities from the surrounding sand and gravel. These results are got in open works, except in one case, referred to in our last article, where shafts are sunk and levels driven along the veins after the regular Cornish fashion. Most of this auriferous gangue in the vicinity of the Urals is poor, but as the gold-bearing sands extend for 200 miles north and south of the town of Ekaterinbourg, and as it is easily procured, the produce of this district, before the Californian and Australian discoveries, furnished the chief supply of Europe. The methods of washing vary throughout this region; but the two principal systems, as displayed by models in the Exhibition, are handwashing, and the cylinder machine. By the first method a sloping table, similar to a German buddle, is used: at its head is a box, with a finely perforated iron bottom, into which the auriferous mineral is thrown, and a stream of water is allowed to flow into the box, which gradually washes the finer particles through the apertures, and on to the sloping table. Here the slimy matters are kept constantly brushed upwards by hand, to accomplish more effectually the separation of the gold. The tails from these buddles then pass to a second series of sloping tables, where the same operation is repeated. The chief portion of metal collects at the head of the first buddle, and is next examined by magnets, to extract the iron ore with which it is generally associated. The rich orey matters are next smelted, with a large quantity of flux, soda, nitre, and borax. A button of the precious metal collects at the bottom, and the liquid slag, which encloses globules of gold, is crushed and re-washed, the impure metal is next melted with lead, and the alloy then cupelled in the ordinary manner.

The other and more systematic method of treating the ores, and which is followed in most of these mines, is carried on by means of a conical horizontal cylinder of perforated sheet-iron, similar to the amalgamating cylinder used in lead-dressing works. The length is 7 or 8 ft., diameter from 5 to 2ft., and the holes about ½ in. Water-wheels are used as the motive-power where convenient, but more commonly a sort of gin, propelled by horses or bullocks. The orey mineral is shot down through a hopper, and enters the small end of the cylinder. Water-pipes are conducted through the inside of this cylinder, perforated, to allow the water to be incessantly and uniformly sprinkled on the minerals during the revolution of the machine, which is driven at from 30 to 40 revolutions per minute. By this means the finer particles are expelled through the apertures, and are received upon a sloping table or buddle, where large brushes, suspended in the form of pendulums, and worked from the main shaft, keep the slimy matters in continual agitation. These sloping tables are furnished with strips of wood, nailed on horizontally, with the view of retarding the flow of water, and retaining the heavier metallic particles. In many of the works the sands are so thoroughly exhausted by this process that the tails are thrown away as useless. The larger minerals in the revolving cylinder pass out at the wider and, therefore, lower end, and what pieces of gold adhere to the quartz, being clean washed with the water, are separated by careful hand picking. In some of the works this machine, driven by two horses, treats 100 tons of ore per day of 10 hours, resulting in about 2 tons of rich auriferous sand, and perhaps a few handpicked nuggets. The rich sand is next washed on small sloping tables, with a gentle flow of water, in the same manner as in the last process, but more carefully, and the heads are then fused with lead for cupellation.

On the banks of the Volga, west from this district, stands the town of Nijni-Novgorod, the Sheffield of Russia. The articles exhibited from this town were chiefly manufactured steel goods, and notably cutlery. The trade was represented by some ten exhibitors. One of the chief is the firm of Zavialoff Brothers, of Vorsma. They show an admirable collection of knives, scissors, and edge tools of various forms. The general workmanship seemed good, and the material firm, but the finish is by no means equal to our best Sheffield or Liége goods. In this steel tool manufactory the annual production is 60,000 dozen knives, 8000 dozen pairs of scissors, and 5000 dozen other descriptions of cutlery, amounting to the value, at the works, of 50,000*l*. The grinding and polishing machines, to the number of 120, are driven by steam. There are 400 hands employed, and in the accessory department 800 more.

Further to the west, from the neighbourhood of Moscow, an invention is exhibited under the name of Carboleine, by the patentee, Joseph Jeschke, of Moscow. In that city there are spirit distilleries, and advantage is taken of the waste products to make the small coal agglutinate into compact masses, which for storage or combustion are equal to the best lumps. Established in 1871, this work has already made a considerable connection, and is now turning out from 2000 to 3000 tons of this artificial fuel annually.

Various machines are exhibited from this district, as agricultural implements, fire-engines and other varieties of pumps, stills, locomotives and other railway work, but call for no special notice.

We sometimes speak of England as a geological epitome of the whole world, presenting, as it does, examples of nearly every stratum from the most recent tertiary to the granite. Russia is quite the contrary, comprising only a few formations, spreading in almost interminable beds for hundreds of miles. Fortunately the coal measures are fairly represented. These may be referred to three main centres—the west, bordering on the Prussian frontier; the east, stretching for several hundred miles along the base of the Urals, from the extreme north to where that mountain chain fades off into the Steppes; and the south, along the lower course of the Don and Donetz. This last is the least known and most promising of the Russian coal fields. Several firms exhibit specimens of minerals, and plans and sections of their collieries. Peter Goubonine, of Orekhovo, has just opened an extensive colliery there. Several beds are at present proved, and, from the nature of the sinkings, there are undoubtedly other measures below. Although only started last year, these pits are now yielding 200 tons of coal per day, and employ a staff of 500 workmen. From the same locality there is an admirable collection of specimens and sections from the Longansk mines. Here both coal and ironstone are found, the iron ore being the clay carbonate, and running in bands alternating with the coal. In these works coke is used for smelting the ironstone, and the displays of crude iron, grey and mottled, are equal to any of the Russian specimens. Blast-furnaces were erected here in 1866, high and modern in their style and arrangement. These works are carried on by the State, and are mainly occupied in manufacturing shells and cannon balls. From the coal fields of the West, taking Dumbrovo as a specimen, there is a large display of different varieties of coal, of fire-clay, models of winding gear, &c. These beds have been worked for a century past. From the Dumbrovo pits 100,000 tons of coal are annually extracted, besides a large quantity of zinc ore, both carbonate and blende, which is manufactured into sheets, nails, castings, &c., to the extent of 1700 tons annually.

The coal field on the flanks of the Ural has only been explored in the vicinity of the metallic mines and gold washings—that is, from about latitude 53 to 60. A large extent still awaits the development of the engineer, and the economic aid of railways. In the Don valley, likewise, we were assured by the Russian commissioners that there are hundreds of miles of coal lands, with beds varying from 3 or 4 ft. to 10 or 20 ft. thick, to be had for "an old song;" and that the Russians generally had little or no spirit to sink unless there was some immediate return to be made. That, in short, Russia's black diamonds were only awaiting British enterprise and capital.

THE BOWLING IRONWORKS, YORKSHIRE.

Mr. Carbutt read before the Mechanical Science Section of the British Association the following paper on "The History, Progress, and Description of the Bowling Ironworks," by Mr. Joseph Wilcock, chief engineer:—

There are several indications in the Bradford district that iron was manufactured here at a remote period of antiquity. It is believed that the Romans both got and worked ironstone in the neighbourhood. Dr. Richardson, the eminent botanist, writing to Hearne, nearly 200 years ago, stated that iron was made in the neighbourhood of Bierley, 2 or 3 miles from Bradford, in the time of the Romans, as upon a heap of cinders being removed to repair the highway there he had discovered a quantity of copper Roman coins. The ironstone cropped out in several places, and in many others it lay very near the surface, so that by making "bell pits" there would be no difficulty in getting the ironstone. Within a few miles of Bradford there are at work the old-established and still flourishing works of Kirkstall Forge, which claim to have been the first establishment to use rolls for slitting iron into nail rods, this process having been carried on there so far back as the year 1594. Thus Bradford and the district may claim to have made Roman implements of warfare, and most probably Saxon, Norman, and old English ones likewise. In fact, this department was carried up to a very recent period, when the Bowling and Low Moor Works manufactured cast-iron guns and mortars. At or about 1784 James Watt was completing his invention of a rotary motion steam-engine, the introduction of which was only required to inaugurate a new era in the history of the iron trade. It was about this time that the Bowling Ironworks were commenced, the first furnace being blown in in the year 1788. Even before that date, however, we have records of some part of the works being in existence, and doing a limited trade in foundry and smith work. But as works for the smelting of ores, they date from the year 1788, three years in advance of the sister works at Low Moor. This was the beginning of the trade of the best Yorkshire irons, now so famous for their qualities through the entire civilised world.

The Bowling Ironworks may properly be considered, therefore, as the pioneer of the great prosperity which has rendered Bradford famous amongst the commercial marts of the world. The population of the borough when the Bowling Works were started would only be about 10,000, as 13 years later, in 1801, it was not more than 13,264, whereas the present population is over 150,000. The establishing of works of this kind, at which employment for a considerable number of men would be insured, must at that period have been regarded as an event of much importance. John Sturges, of Sandal, Wakefield, an ironmaster of repute, was the first to broach the establishing of ironworks on ground where they now stand, and to his knowledge of the necessary minerals to produce a superior iron is to be attributed the choice of the situation.

The engine originally erected for blowing purposes was burnt down a few years after it had been at work, and was replaced by the one called the "old blast-engine," now existing. This was considered to be a great improvement upon the first one, as the valve gear was made self-acting. Below the engine, and constructed in massive masonry work, was made the air chamber for equalising the pressure of the blast. A bar mill and a plate mill were started soon afterwards, and were also driven by a steam-engine, a considerable portion of which was constructed on the spot. We find it stated in "Smiles' Lives of Boulton and Watt" that notice was given to the Bowling Ironworks, near Bradford, of proceedings against the company for the recovery of dues. On this the Bowling Company offered to treat, and young Watt went down to Leeds for the purpose of meeting the representatives of the Bowling Company on the subject. On Feb. 24, 1795, he wrote his friend Matthew Robinson Boulton, as follows:—"Enclosed you have a copy of the Treaty of Peace, not amity, concluded at Leeds on Saturday last between me, Minister Plenipotentiary to your Highness on the one part, and Bowling Pirates in person on the other part. I hope you will ratify the terms, as you will see they are founded entirely upon the principle of indemnity for the past and security for the future." On referring to the private ledger of these works of that date, we found that the Treaty of Peace referred to was purchased at the price of 1640*l*.

The sub-stratum around Bowling is part of the most extensive and valuable coal field in England, stretching from Derby or Nottingham to this district, a distance of 60 miles, and ranging about 8 miles broad. The seam of coal called the Better bed, which is one of the valuable elements necessary for the production of the best quality of iron, is seated upon a peculiar hard silicious sandstone termed "galliard," immediately above the Black bed coal, and resting upon it is an argillaceous stratum, of the mean thickness of 2 yards, in which lies embedded in irregular layers the valuable ironstone of this district. The stone wears a dark brown appearance, and yields about 32 per cent. of iron. Both coals are caking coals, and moderately hard. The ash of the black bed coal is of a dark purple gold colour, similar to roasted pyrites. This coal contains a very large percentage of pyrites, in a state of intimate mixture in the coal, so that it cannot be seen: the ash fuses readily, is slightly alkaline (due to lime), and containing sulphide of iron and a very large quantity of oxide.

The works comprise six cold-blast furnaces, from which about 360 tons of pig-iron are run per week, five refineries, 21 puddling-furnaces, 40 heating furnaces, an extensive forge, a tuyere mill for rolling steel and iron weldless tuyeres, one guide mill, one bar mill, with 15-in. rolls, and two plate mills. A third new plate mill is nearly completed. The powerful reversing engines to give motion to this mill are on the principle introduced by Mr. John Ramsbottom, late of Crewe Works, and when the mill is completed plates can be rolled of the largest superficial area ever yet attempted. There is also an extensive steelworks for making crucible steel, having about 100 pot furnaces, and which is now in process of extension and improvement by the erection of new furnaces on the Siemens and Siemens-Martin principle, to be worked by Siemens' regenerative gas-furnaces. An engineering works comprises foundry, smithy, boiler-fitting, millwright, wheelwright, and fitting shops.

The Bowling Company itself supplies almost all the coal and ironstone which it consumes, its collieries extending 5 or 6 miles in various directions, and the main pits being connected together and with the ironworks by tramways worked with wire-ropes. The total length of these tramways is 21 miles, the number of pits 42, and the number of hands employed in them is more than 2000. To work the pits 61 steam-engines are required, having cylinders varying from 7 to 70 in. in diameter, and to supply them with steam 81 steam-boilers are required, of from 10 to 50-horse power each. In the ironworks are three blast-engines, with blowing cylinders, varying from 76 to 84 in. in diameter, and 14 engines of from 20 to 60-horse power, to give motion to the various machines, besides numerous small engines driving separate machines and pumping water for the boilers. The number of steam-hammers is 13, and helve-hammers 2. The supply of steam is maintained by 33 boilers, of from 20 to 50-horse power each. The number of hands employed at the ironworks is upwards of 1000, thus making a total of upwards of 3000. The yield on the raw ore is 32 per cent. of iron, and on the calcined ore 42 per cent. of iron. The following are the relative quantities of minerals for producing 1 ton of Bowling pig-iron:—Raw ore, 3 tons 3 cwts. 3 qrs. 27 lbs.; calcined ore, 2 tons 7 cwts. 1 qr. 26 lbs.; limestone, 18 cwts. 2 qrs. 12 lbs.; coke, 2 tons 5 cwts. 0 qrs. 9 lbs. The quantity of pig-iron used to produce 1 ton of bar iron (finished) is 1 ton 12 cwts. 1 qr. 25 lbs. The limestone is obtained from Skipton, and is called locally "Skipton old rock." The sulphur in all the sample varies only very slightly, and may, in fact, be considered identical, and the difference in the results not being more than those due to the errors of experiment. The phosphorus in all the samples exists in precisely the same quantity, the whole of this element present in the ore combining with the iron.

I have made a sketch of the original blast-furnace at Bowling, now in existence and working to within two or three weeks, presuming it might be interesting to some of the members of the Association. I have been told by some of the oldest inhabitants of Bowling that there was only one tuyere at first, but two have now been used for many years, the nozzles being 2¾ in. in diameter, and the pressure of blast supplied to this and the other furnaces 32 ozs.

The iron for plates and bars is taken direct to the refineries or oxydising hearths. The metal is placed upon the hearth, covered with coke, and a blast is forced over the surface. Two tons of refined or plate metal are produced from each charge, which is run into moulds cooled by water, the refined metal being about 2 in. thick, and 12 ft. long by 4 ft. broad. From the refineries the plate, or refined metal, is taken to the puddling-furnaces for conversion into malleable iron in the usual manner, by charges of about 3 cwts. at a time, and each puddling-furnace is charged 10 times a-day. The quality of the iron necessitates more attention from the puddler than the commoner classes of iron, and to insure the extra attention and a uniform quality a premium is given to the puddlers who have produced the best specimens during a turn. The puddled iron is taken under the steam-hammer to knock out the slag and impurities, and is made into what are called "stampings" and "nobbins." The stampings are broken into several pieces under fall-hammers, piled, heated, taken under a steam-hammer, and made into blooms or billets, in which state they are taken to the bar or guide mill, re-heated and rolled into round or square bars, angle irons, rods, or such other shapes as may be required. The nobbins are piled, heated, taken under the steam-hammer, and made into bloom or slabs of various sizes, and afterward to the plate, where they are re-heated and rolled into plates.

From stampings are made the Bowling iron weldless tuyeres. A hole about 5 in. in diameter is punched through the centre of the bloom, forming it into a ring of iron. The ring thus made is hooked on the beck of an anvil, and is hammered with a suitably shaped hammer-head to raise up the flange, the ring being constantly rotated on the beck between the blows of the hammer, so that all parts may be evenly worked. At the end of this process the ring begins to have some resemblance to a tuyere, and is then rolled out.

The steelworks were erected in the year 1866, and the steel manufactured is crucible steel, produced in the ordinary manner in furnaces heated by coke. The iron used is scrap from Bowling plates, and its conversion into steel is effected by the addition of suitable quantities of carbon, chiefly introduced by spiegeleisen, and also by a mixture of steel scrap. Of the steel produced a part is used for making tuyeres from ingots, in a similar manner to iron tuyeres and general forgings; and a considerable portion is used for making castings of all descriptions where strength, with lightness, is the desideratum. Arrangements are now being made, and are partly completed, for applying Siemens' gas process for melting the crucible steel in suitable furnaces; and a Siemens-Martin furnace is also in course of erection for the conversion of pig-iron into steel; the furnace will produce 4 tons of steel at one operation.

The engineering is done in one extensive range of buildings, where the whole of the work and new plant required to keep the collieries and works described in repair are made. This department is also devoted to the construction of engines, &c., for the market. In the model room—one of the finest in the country—is a model from which the first wheel was cast for Blenkinsop's locomotive. The boiler-shop is now being extended so as to be capable of producing from two to three boilers per week. The foundry has been recently rebuilt upon the old site.

The distinguished qualities of the Bowling iron are hardness with great pliability, homogeneity and uniformity of texture, capability of withstanding the action of fire, and of receiving the brilliant polish, it being used extensively in the Sheffield trades on account of the last-named virtue. Works established in the infancy of the iron trade and producing a superior quality of metal—quality being always preferred to quantity whenever the alternative presents itself—must naturally be disposed to conservatism. Besides, repeated experiences have proved the necessity of keeping to the original mode of working with the minerals and iron. It is rarely known to what purpose or tests the iron may be put to on leaving the premises, but it is known that it will have to withstand usage such as no common iron, or any other iron but charcoal iron, perhaps, could do, and it was for the latter that the Bowling iron was originally manufactured as a substitute. Keeping in view the production of a uniform quality, changes of whatever description have been jealously regarded, and those that have been made have only been arrived at by very gradual stages.

Mr. H. W. Ripley, on behalf of the Bowling Iron Company, said that the works were started in the latter part of last century by three gentlemen, who each subscribed 5*l*. for the purpose of testing the quality of the iron ore which was found there. They had a few years ago expended over 12,000*l*. in new engines, which had paid for themselves in 18 months by the economy effected.

Rock-Boring Engines.—Mr. John Darlington, of Coleman-street buildings, Moorgate street, London, has patented some improvements in valves, methods of working valves, and feed motions for rock-boring engines, the improvements in valves and method of working valves being partly applicable to other engines.—1. Valve shifted by the compression of steam or air.—2. Valve shifted by the admission of the steam or air-pressure from the main cylinder to the valve cylinder.—3. Enclosing a spiral or twisted valve bar in the cylinder, and actuating the same by means of the piston-rod.—4. Working a slide or piston valve by a device struck by the boring piston.—5. Advance of boring tool by steam or air-pressure acting on a small piston, or by a differential arrangement for working a ratchet and pawl.

Cleaning and Separating Ore.—The invention of Mr. J. H. Hillman, of Trigg Furnace, Kentucky, has for its object to furnish an improved machine for separating or cleansing ores by a current or blast of air, and consists of a revolving cylinder mounted in a frame at an inclination, and driven by a shaft on which it is mounted. A hopper to receive the ore is disposed at the upper end of the cylinder, and a receiving-box at the other. The cylinder, which is partly covered with a jacket, is perforated, a fan at the lower end of the cylinder causing a current of air to pass through it and carry off the dust rubbed off by the rotation of the cylinder.

Tin-Plates.—Mr. J. Maybery, of Old Castle Iron and Tin-Plate Company, Llanelly, has patented some improvements in preparing iron for the manufacture of tin-plates or black plates. The pig or cast iron is charged into a refinery technically termed a melting fire, and melted in the usual way. It is then run out into other refineries, technically termed lumping fires. These fires are fed with tan, in place of as is now usual with charcoal.

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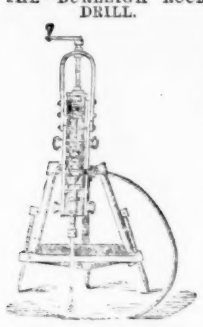

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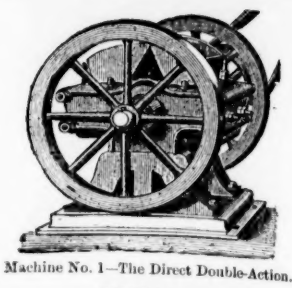

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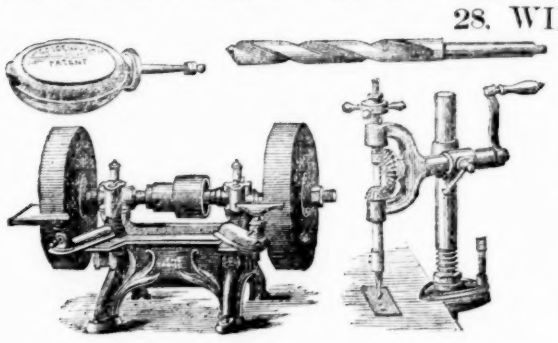

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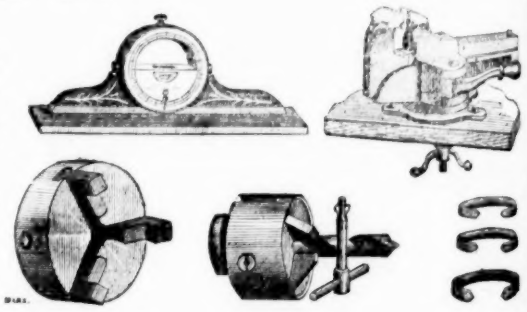

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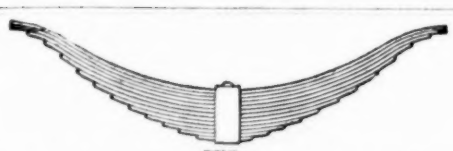

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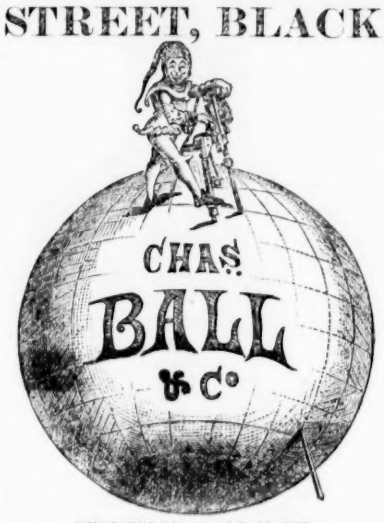

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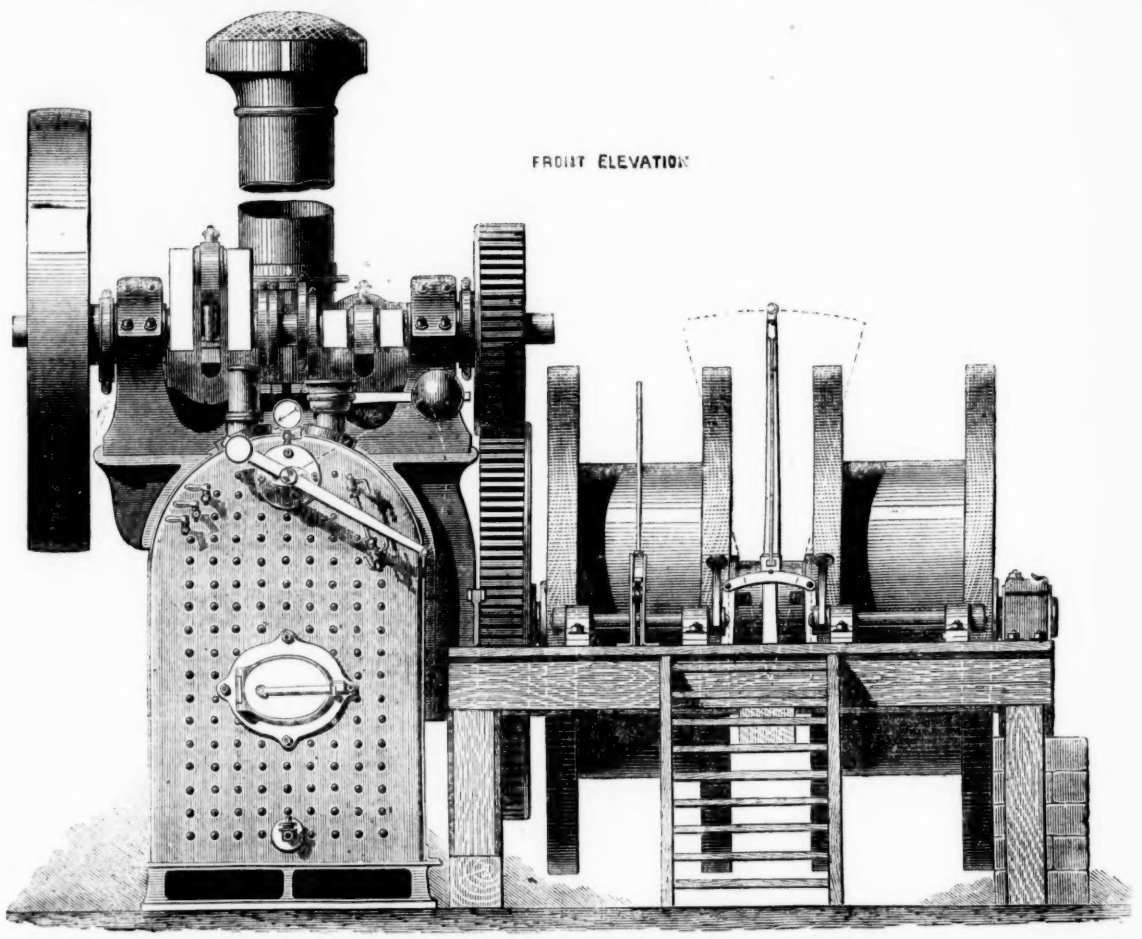

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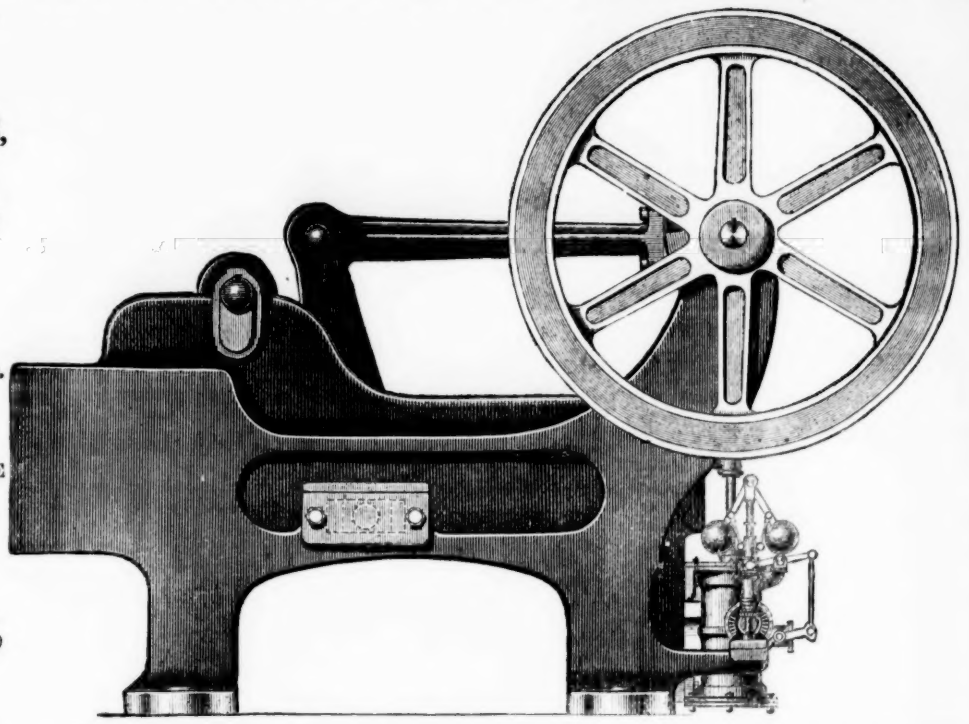

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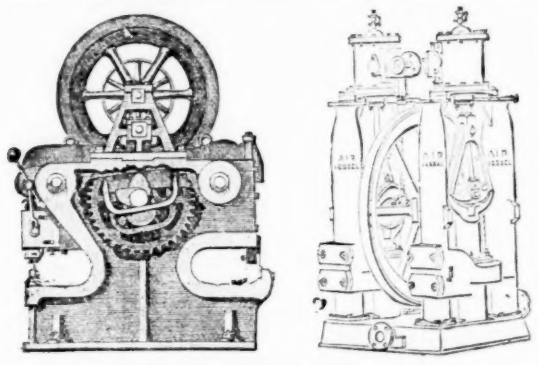

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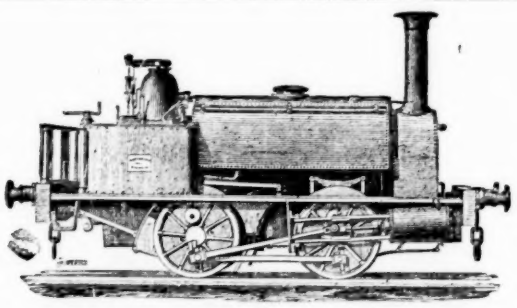

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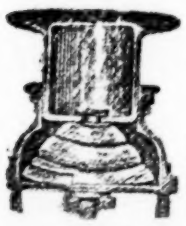

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